

Intermediate Course

Study Material

(Modules 1 to 2)

PAPER 6A

Financial

Management

**(Relevant for May, 2025 and
onward Examinations)**

MODULE – 2



BOARD OF STUDIES

THE INSTITUTE OF CHARTERED ACCOUNTANTS OF INDIA

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CONTENTS

MODULE – 1

Chapter-1: Scope and Objectives of Financial Management

Chapter-2: Types of Financing

Chapter-3: Financial Analysis and Planning-Ratio Analysis

Chapter-4: Cost of Capital

Chapter-5: Financing Decisions-Capital Structure

Chapter-6: Financing Decisions-Leverages

MODULE - 2

Chapter-7: Investment Decisions

Chapter-8: Dividend Decisions

Chapter-9: Management of Working Capital

DETAILED CONTENTS: MODULE – 2

CHAPTER 7 : INVESTMENT DECISIONS..... 7.1-7.106

Learning Outcomes	7.1
Chapter Overview	7.2
1. Introduction	7.2
2. Purpose of Capital Budgeting	7.3
3. Capital Budgeting Process	7.4
4. Types of Capital Investment Decisions.....	7.5
4.1 On the basis of firm's existence	7.5
4.2 On the basis of situations.....	7.6
4.3 Steps of Capital Budgeting Procedure.....	7.7
5. Estimation of Project Cash Flows	7.7
6. Basic Principles for Measuring Project Cash Flows	7.12
6.1 Block of Assets and Depreciation.....	7.12
6.2 Exclusion of Financing Costs Principle	7.14
6.3 Post-tax Principle	7.16
7. Capital Budgeting Techniques	7.17
8. Traditional or Non-Discounting Techniques.....	7.18
8.1 Payback Period	7.18
8.1.1 Payback Reciprocal.....	7.21
8.2 Accounting (Book) Rate of Return (ARR) or Average Rate of Return (ARR)	7.22

9.	Discounting Techniques	7.26
9.1	Net Present Value Technique (NPV)	7.27
9.2	Profitability Index/ Desirability Factor/Present Value Index Method (PI)	7.31
9.3	Internal Rate of Return Method (IRR).....	7.32
9.3.1	Acceptance Rule	7.37
9.3.2	Internal Rate of Return (IRR) and Mutually Exclusive Projects	7.38
9.3.3	The Reinvestment Assumption.....	7.40
9.3.4	Multiple Internal Rate of Return	7.41
9.4	Discounted Payback Period Method	7.42
9.5	Modified Internal Rate of Return (MIRR).....	7.43
9.6	Comparison of Net Present Value and Internal Rate of Return Methods.....	7.45
9.7	Different conclusion in the following scenarios	7.45
10.	Summary of Decision Criteria of Capital Budgeting Techniques	7.52
11.	Special Cases of Capital Budgeting	7.53
11.1	Capital Budgeting under Capital Rationing.....	7.53
11.2	Projects with unequal lives	7.54
	Summary	7.69
	Test Your Knowledge	7.70
	Multiple Choice Questions (MCQs).....	7.70
	Theoretical Questions.....	7.74
	Practical Problems	7.74
	Case Scenarios	7.83

Answers to the MCQs	7.86
Answers to Theoretical Questions.....	7.86
Answers to Practical Problems	7.86
Answers to Case Scenarios.....	7.103

CHAPTER 8 : DIVIDEND DECISION	8.1-8.55
--	-----------------

Learning Outcomes	8.1
Chapter Overview	8.1
1. Introduction	8.2
2. Meaning of Dividend.....	8.3
3. Forms of dividend	8.3
4. Significance of Dividend Policy	8.6
5. Relationship between Retained Earnings and Growth.....	8.8
6. Determinants of Dividend Decisions	8.9
7. Practical Considerations in Dividend Policy.....	8.10
8. Theories of Dividend	8.14
8.1 Dividend's Irrelevance Theory	8.14
8.2 Dividend's Relevance Theory	8.21
9. Stock Splits.....	8.33
9.1 Meaning of Stock Split	8.33
9.2 Advantages of Stock Splits.....	8.33
9.3 Limitations of Stock Splits	8.33
10 Share Buyback.....	8.33
10.1 Meaning of Share Buyback.....	8.33

Summary	8.39
Test Your Knowledge.....	8.40
Multiple Choice Questions (MCQs).....	8.40
Theoretical Questions.....	8.42
Practical Problems	8.42
Case Scenarios.....	8.45
Answers to the MCQs.....	8.47
Answers to Theoretical Questions.....	8.47
Answers to Practical Problems.....	8.48
Answers to Case Scenarios.....	8.54

CHAPTER 9 : MANAGEMENT OF WORKING CAPITAL..... 9.1-9.156

Learning Outcomes	9.1
Chapter Overview	9.2

UNIT I : INTRODUCTION TO WORKING CAPITAL MANAGEMENT9.3

1. Meaning and Concept of Working Capital.....	9.3
2. Significance of Working Capital.....	9.6
2.1 Importance of Adequate Working Capital.....	9.6
2.2 Optimum Working Capital	9.7
3. Determinants of Working Capital	9.8
4. Management of Working Capital	9.10
4.1 Liquidity and Profitability	9.11
4.2 Investment and Financing	9.12
4.3 Approaches of working capital investment.....	9.13

4.4	Current Assets to Fixed Assets Ratio	9.15
5.	Estimating Working Capital Needs.....	9.16
6.	Operating or Working Capital Cycle	9.17
6.1	Working Capital Based on Operating Cycle	9.20
6.2	Estimation of amount of Different Components of Current Assets and Current Liabilities.....	9.22
6.3	Working Capital Requirement Estimation based on Cash Cost.....	9.28
6.4	Effect of Double Shift Working on Working Capital Requirements.....	9.31
UNIT II : TREASURY AND CASH MANAGEMENT		9.37
7.	Treasury Management: Meaning	9.37
8.	Functions of Treasury Department.....	9.38
9.	Management of Cash	9.39
9.1	The Need for Cash	9.39
9.2	Cash Planning	9.40
9.3	Cash Budget	9.40
10.	Methods of Cash Flow Budgeting	9.41
10.1	Cash budget for short period.....	9.42
10.2	Cash Budget for long period	9.50
10.3	Managing Cash Collection and Disbursements.....	9.53
10.4	Accelerating Cash Collections	9.53
10.5	Controlling Payments	9.55
10.6	Determining the Optimum Cash Balance.....	9.59
11.	Cash Management Models.....	9.59

11.1	William J. Baumol's Economic Order Quantity Model, (1952).....	9.59
11.2	Miller-Orr Cash Management Model (1966)	9.61
12.	Recent Developments in Cash Management.....	9.62
12.1	Electronic Fund Transfer	9.63
12.2	Zero Balance Account.....	9.63
12.3	Money Market Operations	9.63
12.4	Petty Cash Imprest System.....	9.64
12.5	Management of Temporary Cash Surplus.....	9.64
12.6	Electronic Cash Management System	9.64
12.7	Virtual Banking	9.65
13.	Management of Marketable Securities	9.67
	UNIT III : MANAGEMENT OF INVENTORY	9.69
14.	Inventory Management	9.69
	UNIT IV : MANAGEMENT OF RECEIVABLES	9.70
15.	Meaning and Objective	9.70
16.	Aspects of Management of Debtors.....	9.70
17.	Factors Determining Credit Policy.....	9.71
18.	Factors under the Control of the Finance Manager	9.72
19.	Approaches to Evaluation of Credit Policies.....	9.73
20.	Financing Receivables	9.82
20.1	Pledging and Factoring.....	9.82
20.2	Forfaiting	9.86
21.	Innovations in Receivable Management.....	9.89
22.	Monitoring of Receivables.....	9.94

UNIT V : MANAGEMENT OF PAYABLES (CREDITORS)	9.98
23. Introduction.....	9.98
24. Cost and Benefits of Trade Credit.....	9.98
25. Computation of Cost of Payables.....	9.99
UNIT VI : FINANCING OF WORKING CAPITAL	9.102
26. Introduction.....	9.102
27. Sources of Finance.....	9.103
27.1 Spontaneous Sources of Finance.....	9.103
27.2 Inter-corporate Loans and Deposits.....	9.104
27.3 Commercial Papers.....	9.104
27.4 Funds Generated from Operations	9.105
27.5 Public Deposits	9.105
27.6 Bills Discounting.....	9.105
27.7 Bill Rediscounting Scheme	9.105
27.8 Factoring.....	9.105
28. Working Capital Finance from Banks.....	9.106
28.1 Instructions on Working Capital Finance by Banks	9.106
29. Forms of Bank Credit.....	9.107
Summary	9.108
Test Your Knowledge.....	9.110
Multiple Choice Questions (MCQs).....	9.110
Theoretical Questions.....	9.115
Practical Problems	9.116
Case Scenarios.....	9.126

Answers to the MCQs	9.128
Answers to Theoretical Questions.....	9.128
Answers to Practical Problems	9.129
Answers to the Case Scenarios	9.154

APPENDIX

Financial Tables	A.1-A.8
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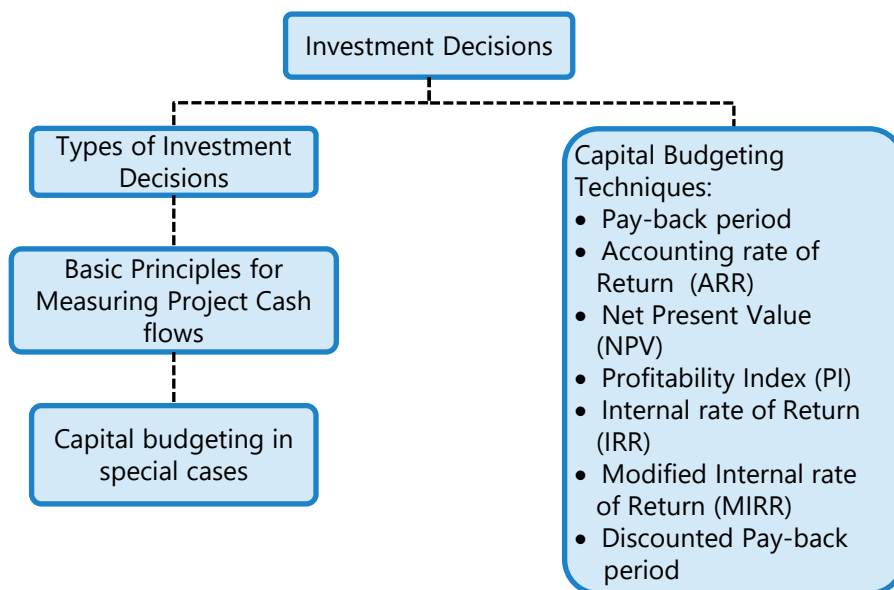
INVESTMENT DECISIONS



LEARNING OUTCOMES

- ◆ State the objectives of capital investment decisions.
- ◆ Discuss the importance and purpose of Capital budgeting for a business entity.
- ◆ Calculate cash flows in capital budgeting decisions and try to explain the basic principles for measuring the same.
- ◆ Discuss the various investment evaluation techniques like Payback Period, Accounting Rate of Return (ARR), Net Present Value (NPV), Profitability Index (PI), Internal Rate of Return (IRR), Discounted Payback Period, and Modified Internal Rate of Return (MIRR).
- ◆ Apply the concepts of the various investment evaluation techniques for capital investment in decision making.
- ◆ Discuss the advantages and disadvantages of the above-mentioned evaluation techniques.

CHAPTER OVERVIEW



1. INTRODUCTION

In the first chapter, we had discussed the three important functions of financial management which are Investment Decisions, Financing Decisions and Dividend Decisions. So far, we have studied Financing decisions in previous chapters. In this chapter, we will discuss the second important decision area of financial management which is Investment Decision. Investment decision is concerned with **optimum utilization of fund to maximize the wealth of the organization** and in turn the wealth of its shareholders. Investment decision is very crucial for an organization to fulfil its objectives; in fact, it generates revenue and ensures long term existence of the organization. Even the entities which exist not for profit are also required to make investment decision though not to earn profit but to fulfil its mission.

As we have seen in the Financing Decision chapter, each rupee of capital raised by an entity bears some cost, commonly known as cost of capital. It is necessary that each rupee raised is to be invested in a very prudent manner. It requires a proper planning for capital, and it is done through a proper budgeting. A proper budgeting

requires all the characteristics of budget. Due to this feature, investment decisions are very popularly known as Capital Budgeting, which means applying the principles of budgeting for capital investment.

In simple terms, Capital Budgeting involves:

- **Identification** of investment projects that are strategic to business' overall objectives;
- **Estimating and evaluating** post-tax incremental cash flows for each of the investment proposals; and
- **Selection** of an investment proposal that maximizes the return to the investors.



2. PURPOSE OF CAPITAL BUDGETING

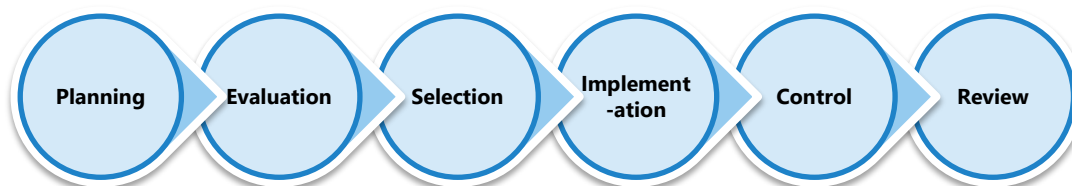
The capital budgeting decisions are important, crucial and critical business decisions due to the following reasons:

- (i) **Substantial Investment :** Investment decisions are related with fulfillment of long-term objectives and existence of an organization. To invest in a project(s), a substantial capital investment is required. Based on size of capital and timing of cash flows, sources of finance are selected. Due to huge capital investments and associated costs, it is therefore necessary for an entity to make such decisions after a thorough study and planning.
- (ii) **Long time period:** The capital budgeting decision has its effect over a long period of time. These decisions not only affect the future benefits and costs of the firm but also influence the rate and direction of growth of the firm.
- (iii) **Irreversibility:** Most of the investment decisions are irreversible. Once the decision is implemented, it is very difficult and reasonably and economically not possible to reverse the decision. The reason may be upfront payment of amount, contractual obligations, technological impossibilities etc.
- (iv) **Complex decisions:** The capital investment decision involves an assessment of future events, which in fact is difficult to predict. Further, it is quite difficult to estimate in quantitative terms, all the benefits or the costs relating to a particular investment decision.



3. CAPITAL BUDGETING PROCESS

The extent to which the capital budgeting process needs to be formalised and systematic procedures to be established depends on the size of the organisation; number of projects to be considered; direct financial benefit of each project considered by itself; the composition of the firm's existing assets and management's desire to change that composition; timing of expenditures associated with the projects that are finally accepted.

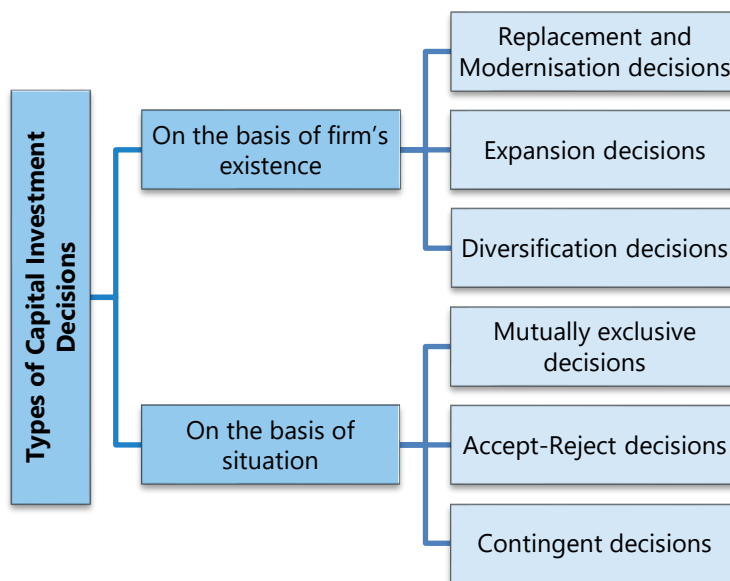


- (i) **Planning:** The capital budgeting process begins with the **identification of potential investment opportunities**. The opportunity then enters the planning phase when the potential effect on the firm's fortunes is assessed and the ability of the management of the firm to exploit the opportunity is determined. Opportunities having little merit are rejected and promising opportunities are advanced in the form of a proposal to enter the evaluation phase.
- (ii) **Evaluation:** This phase involves the **determination of proposal** and its investments, inflows and outflows. Investment appraisal techniques, ranging from the simple payback method and accounting rate of return to the more sophisticated discounted cash flow techniques, are used to appraise the proposals. The technique selected should be the one that enables the manager to make the best decision in the light of prevailing circumstances.
- (iii) **Selection:** Considering the returns and risks associated with the individual projects as well as the cost of capital to the organisation, the organisation will **choose among the projects** which maximises the shareholders' wealth.
- (iv) **Implementation:** When the final selection is made, the firm must acquire the necessary funds, purchase the assets, and begin the **implementation of the project**.

- (v) **Control:** The **progress of the project is monitored** with the aid of feedback reports. These reports will include capital expenditure progress reports, performance reports comparing actual performance against plans set and post completion audits.
- (vi) **Review:** When a project terminates, or even before, the organisation should **review the entire project** to explain its success or failure. This phase may have implication for firm's planning and evaluation procedures. Further, the review may produce ideas for new proposals to be undertaken in the future.

4. TYPES OF CAPITAL INVESTMENT DECISIONS

There are many ways to classify the capital budgeting decision. Generally capital investment decisions are classified in two ways. One way is to classify them on the basis of firm's existence. Another way is to classify them on the basis of decision situation.



4.1 On the basis of firm's existence

The capital budgeting decisions are taken by both newly incorporated firms as well as by existing firms. The new firms may require decision making in respect of selection of a plant to be installed. Whereas the existing firm may require taking

decisions to meet the requirement of new environment or to face the challenges of competition. These decisions may be classified as follows:

- (i) **Replacement and Modernisation decisions:** The replacement and modernisation decisions aims to improve operating efficiency and reduce cost. Generally, all types of plant and machinery require replacement either because the economic life of the plant or machinery is over or because it has become technologically outdated. The former decision is known as replacement decision and latter is known as modernisation decision. Both replacement and modernisation decisions are called as cost reduction decisions.
- (ii) **Expansion decisions:** Existing successful firms may experience growth in demand of their product line. If such firms experience shortage or delay in the delivery of their products due to inadequate production facilities, they may consider proposal to add capacity to existing product line.
- (iii) **Diversification decisions:** These decisions require evaluation of proposals to diversify into new product lines, new markets etc. for reducing the risk of failure by dealing in different products or by operating in several markets.

Both expansion and diversification decisions are called revenue expansion decisions.

4.2 On the basis of situations

The capital budgeting decisions on the basis of situations are classified as follows:

- (i) **Mutually exclusive decisions:** The decisions are said to be mutually exclusive if two or more alternative proposals are such that the **acceptance of one proposal** will exclude the acceptance of the other alternative proposals. For instance, a firm may be considering proposal to install a semi-automatic or highly automatic machine. If the firm installs a semi-automatic machine, it excludes the acceptance of proposal to install highly automatic machine.
- (ii) **Accept-Reject decisions:** The accept-reject decisions occur when **proposals are independent** and do not compete with each other. The firm may accept or reject a proposal on the basis of a minimum return on the required investment. All those proposals which give a higher return than certain desired rate of return are accepted and the rest are rejected.

- (iii) **Contingent decisions:** The contingent decisions are made when the proposals are **dependable** proposals. The investment in one proposal requires investment in one or more other proposals. For example, if a company accepts a proposal to set up a factory in remote area, it will have to invest in infrastructure, like building of roads, houses for employees etc. also.

4.3 Steps of Capital Budgeting Procedure

1. **Estimation** of Cash flows over the entire life for each of the projects under consideration.
2. **Evaluate** each of the alternative, using different decision criteria.
3. **Determining** the minimum required rate of return (i.e., WACC) to be used as discount rate.

Accordingly, this chapter is divided into two sections:

1. Estimation of Cash Flows
2. Capital Budgeting Techniques

SECTION 1

5. ESTIMATION OF PROJECT CASH FLOWS

Capital Budgeting analysis considers only **incremental cash flows** from an investment likely to result due to acceptance of any project. Therefore, one of the most important tasks in capital budgeting is estimating future cash flows for a project. Though one of the techniques i.e., Accounting Rate of Return (ARR) evaluates profitability of a project on the basis of accounting profit, but accounting profit has its own limitations. Timings of cash flow may not match with the period of profit. Further, non-cash items like depreciation have no immediate cash outflow.

The cash flows are estimated on the basis of inputs provided by various departments such as Production department, Finance department, Marketing department, etc. The project cash flow stream consists of cash outflows and cash inflows. The costs are denoted as "cash outflows" whereas the benefits are denoted as "cash inflows".

An investment decision implies the choice of an objective, an appraisal technique and the project's life. The objective and technique must be related to definite period of time. The life of the project may be determined by taking into consideration the following factors:

- (i) Technological obsolescence;
- (ii) Physical deterioration; and
- (iii) Decline in demand for the product

No matter how good a company's maintenance policy, technological or demand forecasting abilities are, uncertainty will always be there.

Calculating Cash Flows: Before we analyze how cash flow is computed in capital budgeting decision, following items needs consideration:

(a) Depreciation: As mentioned earlier, depreciation is a **non-cash item** and itself does not affect the cash flow. However, we must consider tax shield or benefit from depreciation in our analysis. Since this benefit reduces cash outflow for taxes, it is considered as cash inflow. To understand how depreciation acts as tax shield, let us consider following example:

Example -1

X Ltd. manufactures electronic motors fitted in desert coolers. It has an annual turnover of ₹ 30 crore and cash expenses to generate this much of sale is ₹ 25 crore. Suppose applicable tax rate is 30% and depreciation is ₹ 1.50 crore p.a.

The table below is showing Tax shield due to depreciation under two scenarios i.e., with and without depreciation:

	No Depreciation is Charged (₹ Crore)	Depreciation is Charged (₹ Crore)
Total Sales	30.00	30.00
Less: Cost of Goods Sold	(25.00)	(25.00)
	5.00	5.00
Less: Depreciation	-	1.50
Profit before tax	5.00	3.50
Less: Tax @ 30%	1.50	1.05

Profit after Tax	3.50	2.45
Add: Depreciation*	-	1.50
Cash Flow	3.50	3.95

* Being non- cash expenditure depreciation has been added back while calculating the cash flow.

As we can see in the above table that due to depreciation under the second scenario, a tax saving of ₹ 0.45 crore (₹ 1.50 – ₹ 1.05) was made. This is called tax shield. The tax shield is considered while estimating cash flows.

(b) Opportunity Cost: Opportunity cost is **foregoing of a benefit** due to choosing an alternative investment option. For example, if a company owns a piece of land acquired 10 years ago for ₹ 1 crore can be sold for ₹ 10 crore in today's value. If the company uses this piece of land for a project, then its sale value i.e. ₹ 10 crore forms the part of initial outlay as by using the land the company has foregone ₹ 10 crore which could be earned by selling it. This opportunity cost can occur both at the time of initial outlay and during the tenure of the project.

Opportunity costs are considered for estimation of cash outflows.

(c) Sunk Cost: Sunk cost is an outlay of cash that has **already been incurred** in the past and cannot be reversed in present. Therefore, these costs do not have any impact on decision making, hence should be excluded from capital budgeting analysis. For example, if a company has paid a sum of ₹ 1,00,000 for consultancy fees to a firm to prepare a Project Report for analysing a particular project i.e. Feasibility study or viability study. Then the consultancy fee paid is irrelevant and is not considered for estimating cash flows as it has already been paid and shall not affect our decision whether project should be undertaken or not.

(d) Working Capital: Every big project requires working capital because, for every business, investment in working capital is must. Therefore, while evaluating the projects, **initial working capital requirement** should be treated as **cash outflow and at the end of the project its release should be treated as cash inflow**. It is important to note that no depreciation is provided on working capital though it might be possible that at the time of its release its value might have been reduced. Further there may be also a possibility that additional working capital may be required during the life of the project. In such cases the additional working capital required is treated as cash outflow at that period of time. Similarly, any

reduction in working capital shall be treated as cash inflow. It may be noted that, if nothing has been specifically mentioned for the release of working capital it is assumed that full amount has been realized at the end of the project. However, adjustment on account of increase or decrease in working capital needs to be incorporated.

(e) Allocated Overheads: As discussed in the subject of Cost and Management Accounting, allocated overheads are charged on the basis of some **rational basis** such as machine hour, labour hour, direct material consumption etc. Since, expenditures already incurred are allocated to new proposal, they should not be considered as cash flows. However, if it is expected that overhead cost shall increase due to acceptance of any proposal then incremental overhead cost shall be treated as cash outflow.

(f) Additional Capital Investment: It is not necessary that capital investment shall be required in the beginning of the project. It can also be required during the continuance of the project. In such cases, it shall be treated as cash outflows at that period of time.

Categories of Cash Flows: It is helpful to place project cash flows into three categories:

(a) Initial Cash Outflow: The initial cash outflow for a project depends upon the type of capital investment decision as follows:

- (i) If decision is related to investment in a **fresh proposal** or an expansion decision, then initial cash outflow shall be calculated as follows:

		Amount	Amount
	Cost of new Asset(s)		xxx
Add:	Installation/Set-Up Costs	xxx	
Add:	Investment in Working Capital	xxx	xxx
	Initial Cash Outflow		xxx

- (ii) If decision is related to **replacement decision**, then initial cash outflow shall be calculated as follows:

		Amount	Amount
	Cost of new Asset(s)		xxx

Add:	Installation/Set-Up Costs	xxx	
Add/(less):	Increase (Decrease) in net Working Capital level	xxx	
Less:	Net Proceeds from sale of old assets	(xxx)	
Add/(less):	Tax expense (saving/ loss) due to sale of Old Asset	xxx	xxx
	Initial Cash Outflow		xxx

(b) Interim Cash Flows: After making the initial cash outflow that is necessary to begin implementing a project, the firm hopes to get benefit from the future cash inflows generated by the project. The initial cash outflow for a project depends upon the type of capital investment decision as follows:

- (i) If analysis is related to a fresh or completely a **new project** then interim cash flow is calculated as follows:

		Amount	Amount
	Profit after Tax (PAT)		xxx
Add:	Non-Cash expenses (e.g. Depreciation)	xxx	
Add/(less):	Net decrease (increase) in Working Capital	xxx	xxx
	Interim net cash flow for the period		xxx

- (ii) Similarly, interim cash flow in case of replacement decision shall be calculated as follows:

		Amount	Amount
	Net increase (decrease) in Operating Revenue		xxx
Add/(less):	Net decrease (increase) in operating expenses		xxx
	Net changes in income before taxes		xxx

Add/(less):	Net decrease (increase) in taxes		xxx
	Net change in income after taxes		xxx
Add/(less):	Net decrease (increase) in depreciation charges		xxx
	Incremental net cash flow for the period		xxx

(c) Terminal-Year Net Cash Flow: For calculating the net cash flow at the terminal year, we will first calculate the incremental net cash flow for the period as calculated in point (b) above and further, we will make adjustments to it as follows:

		Amount	Amount
	Final salvage value (disposal costs) of asset		xxx
Add:	Interim Cash Flow	xxx	
Add/(less):	Tax savings (tax expenses) due to sale or disposal of asset (Including depreciation)	xxx	
Add:	Release of Net Working Capital	xxx	xxx
	Terminal Year net cash flow		xxx

6. BASIC PRINCIPLES FOR MEASURING PROJECT CASH FLOWS

For developing the project cash flows, the following principles must be kept in mind.

6.1 Block of Assets and Depreciation

From above discussion, it is clear that tax shield/ benefit from depreciation is considered while calculating cash flows from the project. Taxable income is calculated as per the provisions of Income Tax or similar Act of a country. The treatment of depreciation is based on the concept of "Block of Assets", which means a group of assets falling within a particular class of assets. This class of assets can be building, machinery, furniture etc. in respect of which depreciation is charged at

same rate. The treatment of tax depends on the fact whether block of asset consist of one asset or several assets. To understand the concept of block of asset, let us discuss an example as follows:

Example- 2

Suppose A Ltd. acquired new machinery for ₹ 1,00,000, depreciable at 20% as per written down value (WDV) method. The machine has an expected life of 5 years with salvage value of ₹ 10,000. The treatment of depreciation/ short term capital loss in the 5th year in two cases shall be as follows:

Depreciation for initial 4 years shall be common and WDV at the beginning of the 5th year shall be computed as follows:

	₹
Purchase Price of Machinery	1,00,000
Less: Depreciation @ 20% for year 1	20,000
WDV at the end of year 1	80,000
Less: Depreciation @ 20% for year 2	16,000
WDV at the end of year 2	64,000
Less: Depreciation @ 20% for year 3	12,800
WDV at the end of year 3	51,200
Less: Depreciation @ 20% for year 4	10,240
WDV at the end of year 4	40,960

- (i) **Case 1 - There is no other asset in the Block:** When there is only one asset in the block and block shall cease to exist at the end of 5th year, then no depreciation shall be charged in 5th year and tax benefit/loss on short term capital loss/ gain shall be calculated as follows:

	₹
WDV at the beginning of year 5	40,960
Less: Sale value of Machine	10,000
Short Term Capital Loss (STCL)	30,960
Tax Benefit on STCL @ 30%	9,288

- (ii) **Case 2 - More than one asset exists in the Block:** When more than one asset exists in the block, then depreciation shall be charged in the terminal year (5th year) in which asset is sold. The WDV on which depreciation be charged shall be calculated by deducting sale value from the WDV in the beginning of that year. Tax benefit on depreciation shall be calculated as follows:

	₹
WDV at the beginning of year 5	40,960
Less: Sale value of Machine	10,000
WDV	30,960
Depreciation @ 20%	6,192
Tax Benefit on Depreciation @ 30%	1,858

Now suppose if in above two cases, sale value of machine is ₹ 50,000, then no depreciation shall be provided in Case 2 because the WDV at the beginning of 5th year is only ₹ 40,960 i.e., less than sale value of ₹ 50,000 and tax loss on STCG in Case 1 shall be computed as follows:

	₹
WDV at the beginning of year 5	40,960
Less: Sale value of Machine	50,000
Short Term Capital Gain (STCG)	9,040
Tax outflow on STCG @ 30%	2,712

6.2 Exclusion of Financing Costs Principle

When cash flows relating to long-term funds are being defined, financing costs of long-term funds (interest on long-term debt and equity dividend) should be excluded from the analysis. The interest and dividend payments are reflected in the weighted average cost of capital. Hence, if interest on long-term debt and dividend on equity capital are deducted in defining the cash flows, the cost of long-term funds will be counted twice.

The **exclusion** of financing costs principle means that:

- (i) **The interest on long-term debt** is ignored while computing profits and taxes.
- (ii) **The expected dividends** are deemed irrelevant in cash flow analysis.

While dividends pose no difficulty as they come only from profit after taxes, interest needs to be handled properly. Since interest is usually deducted in the process of arriving at profit after tax, an amount equal to 'Interest (1 – Tax rate)' should be added back to the figure of Profit after Tax as shown below:

$$\begin{aligned}
 &= \text{Profit Before Interest and Tax} \times (1 - \text{Tax rate}) \\
 &= (\text{Profit Before Tax} + \text{Interest}) (1 - \text{Tax rate}) \\
 &= (\text{Profit Before Tax}) (1 - \text{Tax rate}) + (\text{Interest}) (1 - \text{Tax rate}) \\
 &= \text{Profit After Tax} + \text{Interest} (1 - \text{Tax rate})
 \end{aligned}$$

Thus, whether the tax rate is applied directly to the profit before interest and tax figure or whether the tax – adjusted interest, which is simply interest (1 – tax rate), is added to profit after tax, we get the same result only.

Example- 3

Suppose XYZ Ltd.'s expected profit for the forthcoming 4 years is as follows:

	Year 1	Year 2	Year 3	Year 4
Profit before Interest and Tax	₹ 10,000	₹ 20,000	₹ 40,000	₹ 50,000

If interest payable is ₹ 5,000 and tax rate is 30%, then the profit after tax excluding financing cost shall be as follows:

	Year 1 (₹)	Year 2 (₹)	Year 3 (₹)	Year 4 (₹)
Profit before Interest and Tax	10,000	20,000	40,000	50,000
Less: Interest	(5,000)	(5,000)	(5,000)	(5,000)
	5,000	15,000	35,000	45,000
Less: Tax @ 30%	(1,500)	(4,500)	(10,500)	(13,500)
Profit after Tax (PAT)	3,500	10,500	24,500	31,500
Add: Interest (1 - t)	3,500	3,500	3,500	3,500
PAT excluding financing cost	7,000	14,000	28,000	35,000

Alternatively

	Year 1 (₹)	Year 2 (₹)	Year 3 (₹)	Year 4 (₹)
Profit before Interest and Tax	10,000	20,000	40,000	50,000
Less: Tax @ 30%	3,000	6,000	12,000	15,000
PAT excluding financing cost	7,000	14,000	28,000	35,000

6.3 Post-tax Principle

Tax payments like other payments must be properly deducted in deriving the cash flows. That is, cash flows must be defined in post-tax terms. It is always better to avoid using pre-tax cash flows and using pre-tax discounting rate. The discounting rate and the cash flows, both must be post-tax only.

Statement showing the calculation of Cash Inflow After Tax (CFAT)

Particulars	(₹)	(₹)
Sales value		xxx
Less: Variable Cost		xxx
Contribution		xxx
Less: Fixed Cost		
(a) Fixed Cash Cost (excluding Interest)	xxx	
(b) Depreciation	xxx	xxx
Earning Before Tax (EBT)		xxx
Less: Tax		xxx
Earning After Tax (EAT)		xxx
Add: Depreciation		xxx
Cash Inflow After Tax (CFAT)		xxx

ILLUSTRATION 1

ABC Ltd is evaluating the purchase of a new machinery with a depreciable base of ₹ 1,00,000; expected economic life of 4 years and change in earnings before taxes and depreciation of ₹ 45,000 in year 1, ₹ 30,000 in year 2, ₹ 25,000 in year 3 and ₹ 35,000 in year 4. Assume straight-line depreciation and a 20% tax rate. You are required to COMPUTE relevant cash flows.

SOLUTION

Depreciation = ₹ 1,00,000 ÷ 4 = ₹ 25,000

Amount in (₹)

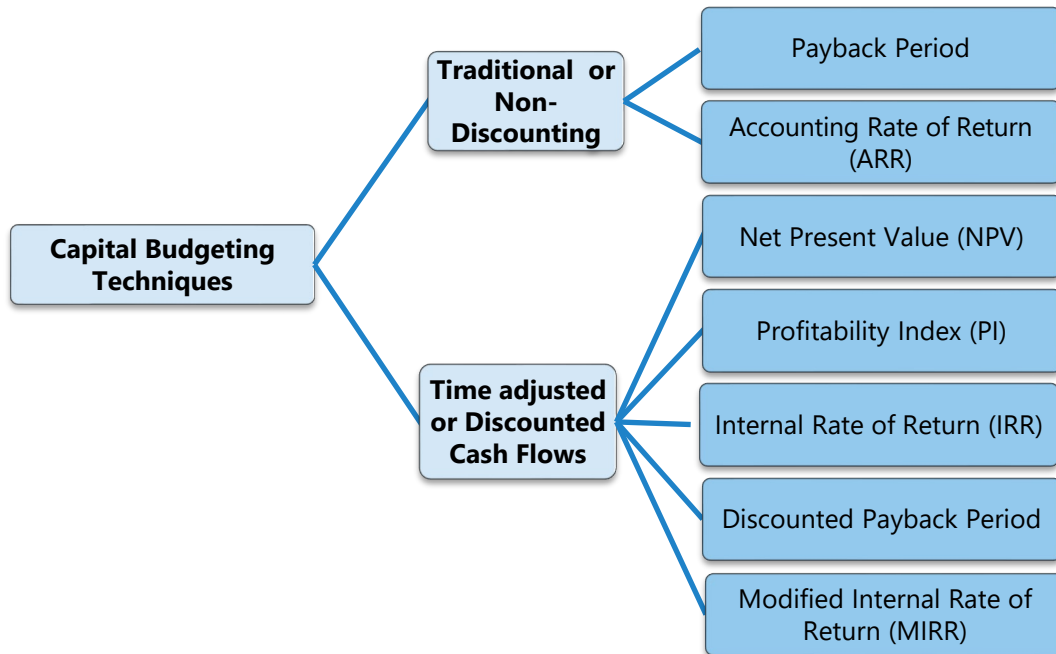
	Years			
	1	2	3	4
Earnings before tax and depreciation	45,000	30,000	25,000	35,000
Less: Depreciation	(25,000)	(25,000)	(25,000)	(25,000)
Earnings before tax	20,000	5,000	0	10,000
Less: Tax @20%	(4,000)	(1,000)	0	(2,000)
Earnings after tax	16,000	4,000	0	8,000
Add: Depreciation	25,000	25,000	25,000	25,000
Net Cash flow	41,000	29,000	25,000	33,000

SECTION 2

7. CAPITAL BUDGETING TECHNIQUES

In order to maximise the return to the shareholders of a company, it is important that the best or most profitable investment projects are selected. Results of making a bad long-term investment decision can be devastating in both financial and strategic terms. Proper care is required for investment project selection and evaluation.

There are number of techniques available for the appraisal of investment proposals and can be classified as presented below:



Organisations may use one or more of capital investment evaluation techniques from above. Some organisations use different methods for different types of projects while others may use multiple methods for evaluating each project. The techniques discussed below are Payback Period, Accounting Rate of Return (ARR), Net Present Value (NPV), Profitability Index (PI), Internal Rate of Return (IRR), Discounted Payback Period and Modified Internal Rate of Return (MIRR).

8. TRADITIONAL OR NON-DISCOUNTING TECHNIQUES

These techniques of capital Budgeting does not discount the future cash flows. There are two such traditional techniques namely Payback Period and Accounting Rate of Return.

8.1 Payback Period

Time required to recover the initial cash-outflow is called pay-back period. The payback period of an investment is the length of time required for the cumulative total net cash flows from the investment to equal the total initial cash outlays. At

that point in time (payback period), the investor has recovered all the money invested in the project.

Steps in Payback period technique:

- (a) The first step in calculating the payback period is determining the total initial capital investment (cash outflow).
 - (b) The second step is calculating/estimating the annual expected after-tax cash flows over the useful life of the project.
- 1. Uniform Cash Flows:** When the cash inflows are uniform over the useful life of the project, the number of years in the payback period can be calculated using the following equation:

$$\text{Payback period} = \frac{\text{Total initial capital investment}}{\text{Annual expected after - tax net cash flow}}$$

Example- 4

Suppose a project costs ₹ 20,00,000 and yields annually a profit of ₹ 3,00,000 after depreciation @ 12½% (straight line method) but before tax at 50%.

The first step would be to calculate the cash inflow from this project. The cash inflow is calculated as follows:

Particulars	(₹)
Profit before tax	3,00,000
Less: Tax @ 50%	1,50,000
Profit after tax	1,50,000
Add: Depreciation written off	2,50,000
Total cash inflow	4,00,000

While calculating cash inflow, depreciation is added back to profit after tax since it does not result in cash outflow. The cash generated from a project therefore is equal to profit after tax plus depreciation. The payback period of the project shall be:

$$\text{Payback period} = \frac{\text{₹ } 20,00,000}{4,00,000} = 5 \text{ Years}$$

Some Accountants calculate payback period after discounting the cash flows by a predetermined rate and the payback period so calculated is called as 'Discounted payback period' (discussed later on in the chapter).

- 2. Non-Uniform Cash Flows:** When the annual cash inflows are not uniform, the cumulative cash inflow from operations must be calculated for each year. The payback period shall be corresponding period when total of cumulative cash inflows is equal to the initial capital investment. However, if exact sum does not match, then the period in which it lies should be identified. After that we need to compute the fraction of the year. This method can be understood with the help of an example:

Example- 5

Suppose XYZ Ltd. is analyzing a project requiring an initial cash outlay of ₹ 2,00,000 and is expected to generate cash inflows as follows:

Year	Annual Cash Inflows (₹)
1	80,000
2	60,000
3	60,000
4	20,000

It's payback period shall be computed by using cumulative cash flows as follows:

Year	Annual Cash Inflows (₹)	Cumulative Cash Inflows (₹)
1	80,000	80,000
2	60,000	1,40,000
3	60,000	2,00,000
4	20,000	2,20,000

In 3rd year, cumulative cash inflows equal to initial cash outlay i.e., ₹ 2,00,000. Hence, payback period is 3 years.

Suppose if in above example, the initial outlay is ₹ 2,05,000, then:

Payback period shall lie between 3 to 4 years. Since up to 3 years, a sum of ₹ 2,00,000 shall be recovered and balance of ₹ 5,000 shall be recovered in the part (fraction) of 4th year, computation is as follows:

$$\text{Part of 4}^{\text{th}} \text{ year} = \frac{\text{Balance Cash outlay}}{\text{Commulative Cash Inflow at 4}^{\text{th}} \text{ year}} = \frac{\text{₹ 5,000}}{\text{₹ 20,000}} = \frac{1}{4} \text{ year}$$

Thus, total cash outlay of ₹ 2,05,000 shall be recovered in 3¼ years' time.

Advantages of Payback period

- It is **easy to compute**.
- It is easy to understand as it **provides a quick estimate of the time** needed for the organization to recoup the cash invested.
- The length of the payback period can also **serve as an estimate of a project's risk**; the longer the payback period, the riskier the project as long-term predictions are less reliable. In some industries with high obsolescence risk like software industry or in situations where an organization is short on cash, short payback periods often become the determining factor for investments.

Limitations of Payback period

- It **ignores the time value of money**. As long as the payback periods for two projects are the same, the payback period technique considers them equal as investments, even if one project generates most of its net cash inflows in the early years of the project while the other project generates most of its net cash inflows in the latter years of the payback period.
- A second limitation of this technique is its failure to consider an investment's total profitability; it only considers cash inflows up-to the period in which initial investment is fully recovered and **ignores cash flows after the payback period**.
- Payback technique places much emphasis on short payback periods thereby **ignoring long-term projects**.

8.1.1 Payback Reciprocal

As the name indicates, it is the reciprocal of payback period. A major drawback of the payback period method of capital budgeting is that it does not indicate any cut off period for the purpose of investment decision. It is, however, argued that the

reciprocal of the payback would be a close approximation of the Internal Rate of Return (later discussed in detail) if the life of the project is at least twice the payback period and the project generates equal amount of the annual cash inflows. In practice, the payback reciprocal is a helpful tool for quick estimation of rate of return of a project provided its life is at least twice the payback period.

The payback reciprocal can be calculated as follows:

$$\text{Payback Reciprocal} = \frac{\text{Average annual cash in flow}}{\text{Initial investment}}$$

Example- 6

Suppose a project requires an initial investment of ₹ 20,000 and it would give annual cash inflow of ₹ 4,000. The useful life of the project is estimated to be 10 years.

$$\text{In this example, payback reciprocal} = \frac{₹ 4,000 \times 100}{₹ 20,000} = 20\%$$

The above payback reciprocal provides a reasonable approximation of the internal rate of return, i.e. 20%.

8.2 Accounting (Book) Rate of Return (ARR) or Average Rate of Return (ARR)

The accounting rate of return of an investment measures the **average annual net income** of the project (incremental income) as a percentage of the investment.

$$\text{Accounting Rate of Return (ARR)} = \frac{\text{Average annual net income}}{\text{Investment}}$$

The numerator is the average annual net income generated by the project over its useful life. The denominator can be either the initial investment (including installation cost) or the average investment over the useful life of the project. Average investment means the average amount of fund remained blocked during the lifetime of the project under consideration. Further, ARR can be calculated in a number of ways as shown in the following example:

Example- 7

Suppose Times Ltd. is going to invest in a project a sum of ₹ 3,00,000 having a life span of 3 years. Salvage value of machine is ₹ 90,000. The profit before depreciation for each year is ₹ 1,50,000.

The Profit after Tax and value of Investment in the Beginning and at the End of each year shall be as follows:

Year	Profit Before Depreciation (₹)	Depreciation (₹)	Profit after Depreciation (₹)	Value of Investment in (₹)	
				Beginning	End
1	1,50,000	70,000	80,000	3,00,000	2,30,000
2	1,50,000	70,000	80,000	2,30,000	1,60,000
3	1,50,000	70,000	80,000	1,60,000	90,000

The ARR can be computed by following methods as follows:

(a) Version 1: Annual Basis

$$ARR = \frac{\text{Profit after Depreciation}}{\text{Investment in the beginning of the year}} \times 100$$

Year	
1	$\frac{80,000}{3,00,000} = 26.67\%$
2	$\frac{80,000}{2,30,000} = 34.78\%$
3	$\frac{80,000}{1,60,000} = 50\%$

$$\text{Average ARR} = \frac{26.67\% + 34.78\% + 50.00\%}{3} = 37.15\%$$

(b) Version 2: Total Investment Basis

$$ARR = \frac{\text{Average Annual Profit}}{\text{Investment in the beginning}} \times 100$$

$$= \frac{(80,000 + 80,000 + 80,000) / 3}{3,00,000} \times 100 = 26.67\%$$

(c) Version 3: Average Investment Basis

$$ARR = \frac{\text{Average Annual Profit}}{\text{Average Investment}} \times 100$$

$$\text{Average Investment} = (\text{₹ } 3,00,000 + \text{₹ } 90,000)/2 = \text{₹ } 1,95,000$$

$$\begin{aligned} \text{Or, Average Investment} &= \frac{1}{2} (\text{Initial Investment} - \text{Salvage Value}) + \text{Salvage Value} \\ &= \frac{1}{2} (\text{₹ } 3,00,000 - \text{₹ } 90,000) + \text{₹ } 90,000 = \text{₹ } 1,95,000 \end{aligned}$$

$$ARR = \frac{80,000}{1,95,000} \times 100 = 41.03\%$$

Further, it is important to note that project may also require additional working capital during its life in addition to initial working capital. In such situation, formula for the calculation of average investment shall be modified as follows:

$$\frac{1}{2}(\text{Initial Investment} - \text{Salvage Value}) + \text{Salvage Value} + \text{Additional Working Capital}$$

Continuing above example, suppose a sum of ₹ 45,000 is required as additional working capital during the project life, then average investment shall be:

$$= \frac{1}{2} (\text{₹ } 3,00,000 - \text{₹ } 90,000) + \text{₹ } 90,000 + \text{₹ } 45,000 = \text{₹ } 2,40,000 \text{ and}$$

$$ARR = \frac{80,000}{2,40,000} \times 100 = 33.33\%$$

Some organizations prefer the initial investment because it is objectively determined and is not influenced by either the choice of the depreciation method or the estimation of the salvage value. Either of these amounts is used in practice but it is important that the same method be used for all investments under consideration.

Advantages of ARR

- This technique **uses readily available data** that is routinely generated for financial reports and does not require any special procedures to generate data.
- This method may also mirror the method used to **evaluate performance** on the operating results of an investment and management performance. Using the same procedure in both decision-making and performance evaluation ensures consistency.

- Calculation of the accounting rate of return method **considers all net incomes over the entire life of the project** and provides a measure of the investment's profitability.

Limitations of ARR

- The accounting rate of return technique, like the payback period technique, **ignores the time value of money** and considers the value of all cash flows to be equal.
- The technique uses accounting numbers that are dependent on the organization's **choice of accounting procedures**, and different accounting procedures, e.g., depreciation methods, can lead to substantially different amounts for an investment's net income and book values.
- The method **ignores cash flows**; while net income is a useful measure of profitability, the net cash flow is a better measure of an investment's performance.
- Furthermore, inclusion of only the book value of the invested asset **ignores** the fact that a project can require **commitments of working capital** and other outlays that are not included in the book value of the project.

ILLUSTRATION 2

A project requiring an investment of ₹ 10,00,000 and it yields profit after tax and depreciation which is as follows:

Years	Profit after tax and depreciation (₹)
1	50,000
2	75,000
3	1,25,000
4	1,30,000
5	80,000
<i>Total</i>	<i>4,60,000</i>

Suppose further that at the end of the 5th year, the plant and machinery of the project can be sold for ₹ 80,000. DETERMINE Average Rate of Return.

SOLUTION

In this case the rate of return can be calculated as follows:

$$\frac{\text{Total Profit} \div \text{No. of years}}{\text{Average investment / Initial Investment}} \times 100$$

(a) If Initial Investment is considered then,

$$= \frac{₹ 4,60,000 \div 5 \text{ years}}{₹ 10,00,000} \times 100 = \frac{₹ 92,000}{₹ 10,00,000} \times 100 = 9.2\%$$

This rate is compared with the rate expected on other projects, had the same funds been invested alternatively in those projects. Sometimes, the management compares this rate with the minimum rate (called-cut off rate). For example, management may decide that they will not undertake any project which has an average annual yield after tax less than 20%. Any capital expenditure proposal which has an average annual yield of less than 20%, will be automatically rejected.

(b) If Average investment is considered, then,

$$= \frac{₹ 92,000}{\text{Average Investment}} \times 100 = \frac{₹ 92,000}{₹ 5,40,000} \times 100 = 17.04\%$$

Where,

$$\begin{aligned} \text{Average Investment} &= \frac{1}{2} (\text{Initial investment} - \text{Salvage value}) + \text{Salvage value} \\ &= \frac{1}{2} (₹ 10,00,000 - ₹ 80,000) + ₹ 80,000 \\ &= ₹ 4,60,000 + ₹ 80,000 = ₹ 5,40,000 \end{aligned}$$

9. DISCOUNTING TECHNIQUES

Discounting techniques consider time value of money and discount the cash flows to their Present Value. These techniques are also known as Present Value techniques. These are namely Net Present Value (NPV), Internal Rate of Return (IRR) and Profitability Index (PI), Discounted Payback Period. First, let us discuss about Determination of Discount rate and it will be followed by the four techniques.

Determining Discount Rate

Theoretically, the discount rate or **desired / expected rate of return** on an investment is the rate of return the firm would have earned by investing the same

funds in the best available alternative investment that has the same risk. Determining the best alternative opportunity available is difficult in practical terms so rather than using the true opportunity cost, organizations often use an alternative measure for the desired rate of return. An organization may establish a minimum rate of return that all capital projects must meet; this minimum could be based on an industry average or the cost of other investment opportunities. Many organizations choose to use the overall cost of capital or Weighted Average Cost of Capital (WACC) that an organization has incurred in raising funds or expects to incur in raising the funds needed for an investment.

9.1 Net Present Value Technique (NPV)

The net present value technique is a discounted cash flow method that considers the time value of money in evaluating capital investments. An investment has cash flows throughout its life, and it is assumed that an amount of cash flow in the early years of an investment is worth more than an amount of cash flow in a later year.

The net present value method uses a specified discount rate to bring all subsequent cash inflows after the initial investment to their present values (the time of the initial investment is year 0).

The net present value of a project is the amount, in current value of amount, the investment earns after paying cost of capital in each period.

Net present value = Present value of net cash inflow - Total net initial investment

Since it might be possible that some additional investment may also be required during the life time of the project, then appropriate formula shall be:

Net present value = Present value of cash inflows - Present value of cash outflows

It can be expressed as below:

$$NPV = \left(\frac{C_1}{(1+k)} + \frac{C_2}{(1+k)^2} + \frac{C_3}{(1+k)^3} + \dots + \frac{C_n}{(1+k)^n} \right) - I$$

$$NPV = \sum_{t=1}^n \frac{C_t}{(1+k)^t} - I$$

Where,

- C = Cash flow of various years
 k = Discount rate
 N = Life of the project
 I = Investment

Steps for calculating Net Present Value (NPV):

The steps for calculating net present value are:

1. **Determine** the net cash inflow in each year of the investment.
2. **Select** the desired rate of return or discounting rate or Weighted Average Cost of Capital.
3. **Find** the discount factor for each year based on the desired rate of return selected.
4. **Determine** the present values of the net cash flows by multiplying the cash flows by respective discount factors of respective period called Present Value (PV) of Cash flows
5. Total the amounts of all **PVs of Cash Flows**.

Decision Rule:

If NPV \geq 0	Accept the Proposal
If NPV < 0	Reject the Proposal

The NPV method can be used to select between mutually exclusive projects; the one with the higher NPV should be selected.

ILLUSTRATION 3

COMPUTE the net present value for a project with a net investment of ₹ 1,00,000 and net cash flows for year one is ₹ 55,000; for year two is ₹ 80,000 and for year three is ₹ 15,000. Further, the company's cost of capital is 10%.

[PVIF @ 10% for three years are 0.909, 0.826 and 0.751]

SOLUTION

Year	Net Cash Flows (₹)	PVIF @ 10%	Discounted Cash Flows (₹)
0	(1,00,000)	1.000	(1,00,000)
1	55,000	0.909	49,995
2	80,000	0.826	66,080
3	15,000	0.751	11,265
Net Present Value			27,340

Recommendation: Since the net present value of the project is positive, the company should accept the project.

ILLUSTRATION 4

ABC Ltd. is a small company that is currently analyzing capital expenditure proposals for the purchase of equipment; the company uses the net present value technique to evaluate projects. The capital budget is limited to ₹500,000 which ABC Ltd. believes is the maximum capital it can raise. The initial investment and projected net cash flows for each project are shown below. The cost of capital of ABC Ltd is 12%. You are required to COMPUTE the NPV of the different projects.

	Project A (₹)	Project B (₹)	Project C (₹)	Project D (₹)
Initial Investment	200,000	190,000	250,000	210,000
Project Cash Inflows:				
Year 1	50,000	40,000	75,000	75,000
2	50,000	50,000	75,000	75,000
3	50,000	70,000	60,000	60,000
4	50,000	75,000	80,000	40,000
5	50,000	75,000	100,000	20,000

SOLUTION**Calculation of net present value:**

Period	PV factor	Project A (₹)	Project B (₹)	Project C (₹)	Project D (₹)
0	1.000	(2,00,000)	(1,90,000)	(2,50,000)	(2,10,000)
1	0.893	44,650	35,720	66,975	66,975
2	0.797	39,850	39,850	59,775	59,775
3	0.712	35,600	49,840	42,720	42,720
4	0.636	31,800	47,700	50,880	25,440
5	0.567	28,350	42,525	56,700	11,340
Net Present Value		(19,750)	25,635	27,050	(3,750)

Advantages of NPV

- NPV method takes into account the **time value of money**.
- The whole stream of **cash flows is considered**.
- The net present value can be seen as the addition to the wealth of shareholders. The criterion of NPV is thus in conformity with basic financial objectives.
- The NPV uses the **discounted cash flows** i.e., expresses cash flows in terms of current rupees. The NPVs of different projects therefore can be compared. It implies that each project can be evaluated independent of others on its own merit.

Limitations of NPV

- It involves **difficult calculations**.
- The application of this method necessitates forecasting cash flows and the discount rate. Thus, **accuracy of NPV depends on accurate estimation** of these two factors which may be quite difficult in practice.
- The decision under NPV method is based on absolute measure. It **ignores the difference in initial outflows**, size of different proposals etc. while evaluating mutually exclusive projects.

9.2 Profitability Index/Desirability Factor/Present Value Index Method (PI)

The students may have seen how with the help of discounted cash flow technique, the two alternative proposals for capital expenditure can be compared. In certain cases, we have to compare a number of proposals, each involving different amounts of cash inflows.

One of the methods of comparing such proposals is to work out what is known as the 'Desirability factor', or 'Profitability Index' or 'Present Value Index Method'.

Mathematically:

The Profitability Index (PI) is calculated as below:

$$\text{Profitability Index (PI)} = \frac{\text{Sum of discounted cash in flows}}{\text{Initial cash outlay or Total discounted cash outflow (as the case may)}}$$

Decision Rule:

If $PI \geq 1$	Accept the Proposal
If $PI < 1$	Reject the Proposal

In case of mutually exclusive projects, project with higher PI should be selected.

ILLUSTRATION 5

Suppose we have three projects involving discounted cash outflow of ₹ 5,50,000, ₹ 75,000 and ₹ 1,00,20,000 respectively. Suppose further that the sum of discounted cash inflows for these projects are ₹ 6,50,000, ₹ 95,000 and ₹ 1,00,30,000 respectively. CALCULATE the desirability factors for the three projects.

SOLUTION

The desirability factors for the three projects would be as follows:

1.
$$= \frac{₹6,50,000}{₹5,50,000} = 1.18$$
2.
$$= \frac{₹95,000}{₹75,000} = 1.27$$
3.
$$= \frac{₹1,00,30,000}{₹1,00,20,000} = 1.001$$

It can be seen that in absolute terms, project 3 gives the highest cash inflows yet its desirability factor is low. This is because the outflow is also very high. The **Desirability/ Profitability Index factor helps us in ranking various projects.**

Since PI is an extension of NPV, it has same advantages and limitation.

Advantages of PI

- The method also uses the **concept of time value of money.**
- In the PI method, since the present value of cash inflows is divided by the present value of cash outflow, it is a **relative measure** of a project's profitability.

Limitations of PI

- Profitability index **fails as a guide** in resolving capital rationing where **projects are indivisible.**
- Once a single large project with high NPV is selected, possibility of accepting several small projects which together may have higher NPV than the **single project is excluded.**
- Also, situations may arise where a project with a lower profitability index selected may generate cash flows in such a way that another project can be taken up one or two years later, the total NPV in such case being more than the one with a project with highest Profitability Index.

The Profitability Index approach thus **cannot be used indiscriminately** but all other type of alternatives of projects will have to be worked out.

9.3 Internal Rate of Return Method (IRR)

The internal rate of return method considers the time value of money, the initial cash investment, and all cash flows from the investment. But unlike the net present value method, the internal rate of return method does not use the desired rate of return but estimates the discount rate that makes the present value of subsequent cash inflows equal to the initial investment. This discount rate is called IRR.

IRR Definition: Internal rate of return for an investment proposal is **the discount rate that equates the present value of the expected cash inflows with the initial cash outflow.**

This IRR is then compared to a criterion rate of return that can be the organization's desired rate of return for **evaluating capital investments**.

Calculation of IRR: The procedures for computing the internal rate of return vary with the pattern of net cash flows over the useful life of an investment.

Scenario 1: For an investment with uniform cash flows over its life, the following equation is used:

Step 1: Total initial investment = Annual cash inflow × Annuity discount factor of the discount rate for the number of periods of the investment's useful life

If A is the annuity discount factor, then:

$$A = \frac{\text{Total initial cash disbursements and commitments for the investment}}{\text{Annual (equal) cash inflows from the investment}}$$

Step 2: Once A is calculated, the interest rate corresponding to project's life, the value of A is searched in Present Value Annuity Factor (PVAf) table. If exact value of 'A' is found the respective interest rate shall be IRR. However, it rarely happens therefore we follow the steps discussed below:

Step 1: Compute approximate payback period also called fake payback period.

Step 2: Locate this value in PVAf table corresponding to period of life of the project. The value may be falling between two discounting rates.

Step 3: Discount cash flows using these two discounting rates.

Step 4: Use following Interpolation Formula:

$$\begin{aligned} & LR + \frac{NPV \text{ at LR}}{NPV \text{ at LR} - NPV \text{ at HR}} \times (HR - LR) \\ & \text{Or} \\ & LR + \frac{PV \text{ at LR} - CI}{PV \text{ at LR} - PV \text{ at HR}} \times (HR - LR) \end{aligned}$$

Where,

LR = Lower Rate

HR = Higher Rate

CI = Capital Investment

ILLUSTRATION 6

A Ltd. is evaluating a project involving an outlay of ₹ 10,00,000 resulting in an annual cash inflow of ₹ 2,50,000 for 6 years. Assuming salvage value of the project is zero; DETERMINE the IRR of the project.

SOLUTION

First of all, we shall find an approximation of the payback period:

$$= \frac{10,00,000}{2,50,000} = 4$$

Now, we shall search this figure in the PVAF table corresponding to 6-year row.

The value 4 lies between values 4.111 and 3.998, correspondingly discounting rates are 12% and 13% respectively

NPV @ 12% and 13% is:

$$NPV_{12\%} = (10,00,000) + 4.111 \times 2,50,000 = +27,750$$

$$NPV_{13\%} = (10,00,000) + 3.998 \times 2,50,000 = -500$$

The internal rate of return is, thus, more than 12% but less than 13%. The exact rate can be obtained by interpolation:

$$\begin{aligned} \text{IRR} &= 12\% + \frac{27,750}{27,750 - (-500)} \times (13\% - 12\%) \\ &= 12\% + \frac{27,750}{28,250} = 12.978\% \end{aligned}$$

$$\text{IRR} = 12.978\%$$

Scenario 2: When the cash inflows are not uniform over the life of the investment, the determination of the discount rate can involve trial and error and interpolation between discounting rates as mentioned above. However, IRR can also be found out by using following procedure:

Step 1: Discount the cash flow at any random rate, say 10%, 15% or 20%.

Step 2: If resultant NPV is negative, then discount cash flows again by lower discounting rate to make NPV positive. Conversely, if resultant NPV is positive, then again discount cash flows by higher discounting rate to make NPV negative.

Step 3: Use following Interpolation Formula:

$$LR + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} \times (\text{HR} - \text{LR})$$

Where

LR = Lower Rate

HR = Higher Rate

ILLUSTRATION 7

CALCULATE the internal rate of return of an investment of ₹ 1,36,000 which yields the following cash inflows:

Year	Cash Inflows (₹)
1	30,000
2	40,000
3	60,000
4	30,000
5	20,000

SOLUTION

Let us discount cash flows by 10%.

Year	Cash Inflows (₹)	Discounting factor at 10%	Present Value (₹)
1	30,000	0.909	27,270
2	40,000	0.826	33,040
3	60,000	0.751	45,060
4	30,000	0.683	20,490
5	20,000	0.621	12,420
Total present value			1,38,280
Less: Initial Investment			1,36,000
NPV			+2,280

The NPV calculated @ 10% is positive. Therefore, a higher discount rate is suggested, say, 12%.

Year	Cash Inflows (₹)	Discounting factor at 12%	Present Value (₹)
1	30,000	0.893	26,790
2	40,000	0.797	31,880
3	60,000	0.712	42,720
4	30,000	0.636	19,080
5	20,000	0.567	11,340
Total present value			1,31,810
Less: Initial Investment			1,36,000
NPV			- 4,190

The internal rate of return is, thus, more than 10% but less than 12%. The exact rate can be obtained by interpolation:

$$\begin{aligned}
 \text{IRR} &= \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} \times (\text{HR} - \text{LR}) \\
 &= 10 + \frac{₹2,280}{₹2,280 - (-₹4,190)} \times (12 - 10) \\
 &= 10 + \frac{₹2,280}{₹6,470} \times (12 - 10) = 10 + 0.704
 \end{aligned}$$

$$\text{IRR} = 10.704\%$$

ILLUSTRATION 8

A company proposes to install machine involving a capital cost of ₹3,60,000. The life of the machine is 5 years and its salvage value at the end of the life is nil. The machine will produce the net operating income after depreciation of ₹68,000 per annum. The company's tax rate is 45%.

The Net Present Value factors for 5 years are as under:

Discounting rate	14	15	16	17	18
Cumulative factor	3.43	3.35	3.27	3.20	3.13

You are required to COMPUTE the internal rate of return of the proposal.

SOLUTION**Computation of Cash inflow per annum**

₹

Particulars	(₹)
Net operating income per annum	68,000
Less: Tax @ 45%	(30,600)
Profit after tax	37,400
Add: Depreciation (₹ 3,60,000 / 5 years)	72,000
Cash inflow	1,09,400

The IRR of the investment can be found as follows:

$$NPV = - ₹ 3,60,000 + ₹ 1,09,400 (PVA_{F_5, r}) = 0$$

$$\text{or } PVA_{F_5, r} (\text{Cumulative factor}) = \frac{₹ 3,60,000}{₹ 1,09,400} = 3.29$$

As 3.29 falls between Discounted rate 15 & 16, the computation is as below :

Computation of Internal Rate of Return

	Discounting Rate	
	15%	16%
Cumulative factor	3.35	3.27
PV of Inflows (₹)	3,66,490 (₹ 1,09,400 × 3.35)	3,57,738 (₹ 1,09,400 × 3.27)
Less: Initial outlay (₹)	3,60,000	3,60,000
NPV (₹)	6,490	(2,262)

$$IRR = 15 + \left[\frac{6,490}{6,490 + 2,262} \right] \times (16 - 15) = 15 + 0.74 = 15.74\%$$

9.3.1 Acceptance Rule

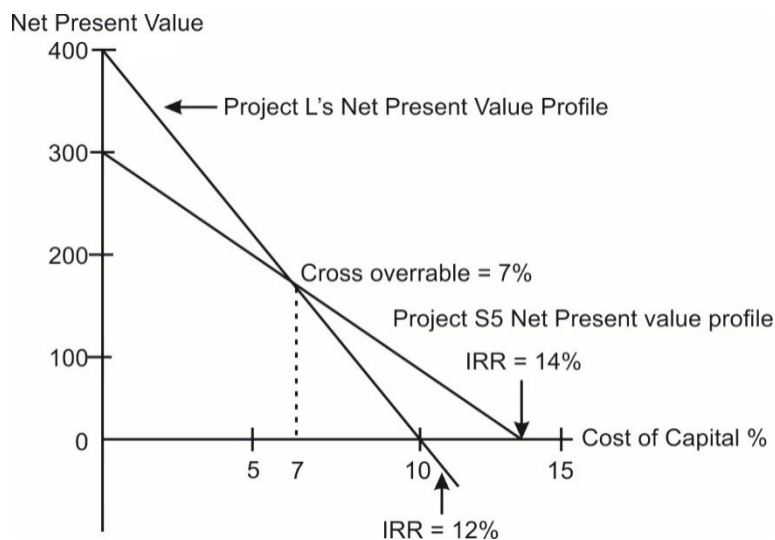
The use of IRR, as a criterion to accept capital investment decision involves a comparison of IRR with the required rate of return known as cut-off rate. The project should be accepted if IRR is greater than cut-off rate. If IRR is equal to cut-

off rate the firm is indifferent. If IRR less than cut off rate the project is rejected. Thus,

If $IRR \geq$ Cut-off Rate or WACC	Accept the Proposal
If $IRR <$ Cut-off Rate or WACC	Reject the Proposal

9.3.2 Internal Rate of Return (IRR) and Mutually Exclusive Projects

Projects are called mutually exclusive, when the selection of one precludes the selection of others e.g. in case a company owns a piece of land which can be put to use either for project S or L, such projects are mutually exclusive to each other i.e. the selection of one project necessarily means the rejection of the other. Refer to the figure below:



As long as the cost of capital is greater than the crossover rate of 7%, (1) NPV_S is larger than NPV_L and (2) IRR_S exceeds IRR_L . Hence, if the cut-off rate or the cost of capital is greater than 7%, both the methods shall lead to selection of project S. However, if the cost of capital is less than 7%, the NPV method ranks Project L higher, but the IRR method indicates that the Project S is better.

As can be seen above, mutually exclusive projects can create problem with the IRR technique as IRR is expressed in percentage and does not take into account the scale of investment or the quantum of money earned.

Let us consider another example of two mutually exclusive projects A and B with the following details:

Example - 8

Cash flows

	Year 0	Year 1	IRR	NPV at 10%
Project A	(₹ 1,00,000)	₹ 1,50,000	50%	₹ 36,360
Project B	(₹ 5,00,000)	₹ 6,25,000	25%	₹ 68,180

Project A earns a return of 50% which is more than what Project B earns; however, the NPV of Project B is more than of Project A. Acceptance of Project A means rejection of Project B since the two Projects are mutually exclusive. Acceptance of Project A also implies that the total investment will be ₹ 4,00,000 less had the Project B been accepted, ₹ 4,00,000 being the difference between the initial investment of the two projects. Assuming that the funds are freely available at 10%, the total capital expenditure of the company should ideally be equal to sum total of all outflows provided they earn more than 10% return along with the chosen mutually exclusive project. Selection of Project A implies rejection of an opportunity to earn an additional amount of ₹ 31,820 (₹ 68,180 - ₹ 36,360) for the shareholders, thus reduction in the shareholders' wealth.

In the above example, the larger project had lower IRR, but maximises the shareholders' wealth. It is not safe to assume that a choice can be made between mutually exclusive projects using IRR in cases where the larger project also happens to have the higher IRR. Consider the following two Projects A and B with their relevant cash flows:

Example- 9

Year	Project A	Project B
	(₹)	(₹)
0	(9,00,000)	(8,00,000)
1	7,00,000	62,500
2	6,00,000	6,00,000
3	4,00,000	6,00,000
4	50,000	6,00,000

In this case, Project A has the larger investment and also has a higher IRR as shown below,

Year	(₹)	r = 46%	PV (₹)	(₹)	r = 35%	PV (₹)
0	(9,00,000)	1.0000	(9,00,000)	(8,00,000)	1.0000	(8,00,000)
1	7,00,000	0.6849	4,79,430	62,500	0.7407	46,294
2	6,00,000	0.4691	2,81,460	6,00,000	0.5487	3,29,220
3	4,00,000	0.3213	1,28,520	6,00,000	0.4064	2,43,840
4	50,000	0.2201	11,005	6,00,000	0.3011	1,80,660
			415			14
IRR of Project A = 46%						
IRR of Project B = 35%						

However, in case the relevant discounting factor is taken as 5%, the NPV of the two projects provides a different picture as follows:

Year	Project A (₹)			Project B (₹)		
	(₹)	r = 5%	PV (₹)	(₹)	r = 5%	PV (₹)
0	(9,00,000)	1.0	(9,00,000)	(8,00,000)	1.0	(8,00,000)
1	7,00,000	0.9524	6,66,680	62,500	0.9524	59,525
2	6,00,000	0.9070	5,44,200	6,00,000	0.9070	5,44,200
3	4,00,000	0.8638	3,45,520	6,00,000	0.8638	5,18,280
4	50,000	0.8227	41,135	6,00,000	0.8227	4,93,620
NPV			6,97,535			8,15,625

It can be seen from the above, Project B should be the one to be selected even though its IRR is lower than that of Project A. This decision shall need to be taken in spite of the fact that Project A has a larger investment coupled with a higher IRR as compared with Project B. **This type of anomalous situation arises due to reinvestment assumptions implicit in the two evaluation methods of NPV and IRR.**

9.3.3 The Reinvestment Assumption

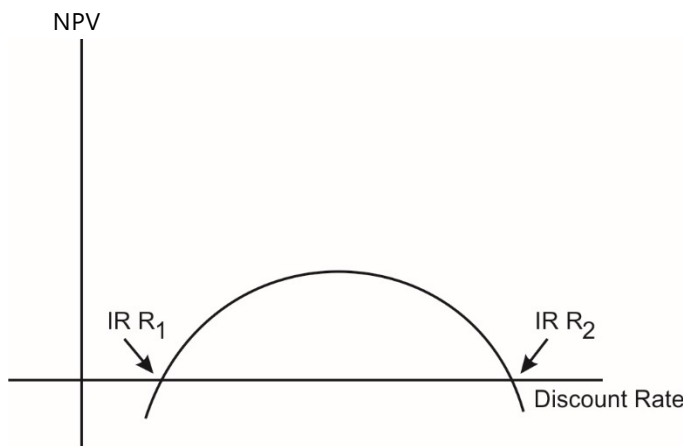
The Net Present Value technique assumes that all **cash flows can be reinvested** at the discount rate used for calculating the NPV. This is a logical assumption since

the use of the NPV technique implies that all projects which provide a higher return than the discounting factor are accepted.

In contrast, IRR technique assumes that all cash flows are reinvested at project's IRR. This assumption means that projects with heavy cash flows in the early years will be favoured by the IRR method vis-à-vis projects which have larger cash flows in the later years. This implicit reinvestment assumption means that Projects like A, with cash flows concentrated in the earlier years of life will be preferred by the method relative to Projects such as B.

9.3.4 Multiple Internal Rate of Return

In cases, where project cash flows change signs or reverse during the life of a project e.g. an initial cash outflow is followed by cash inflows and subsequently followed by a major cash outflow, there may be more than one IRR. The following graph of discount rate versus NPV may be used as an illustration:



In such situations, if the cost of capital is less than the two IRR's, a decision can be made easily, however otherwise the IRR decision rule may turn out to be misleading as the project should only be invested if the cost of capital is between IRR_1 and IRR_2 . To understand the concept of multiple IRR, it is necessary to understand the implicit re-investment assumption in both NPV and IRR techniques.

Advantages of IRR

- This method makes use of the concept of **time value of money**.
- **All the cash flows** in the project **are considered**.

- **IRR is easier to use** as instantaneous understanding of desirability can be determined by comparing it with the cost of capital
- IRR technique **helps in achieving the objective** of maximisation of shareholder's wealth.

Limitations of IRR

- The calculation **process is tedious** if there is more than one cash outflow interspersed between the cash inflows; there can be multiple IRR, the interpretation of which is difficult.
- The IRR approach **creates a peculiar situation** if we compare two projects with different inflow/outflow patterns.
- It is assumed that under this method all the future cash inflows of a proposal are reinvested at a rate equal to the IRR. **It ignores a firm's ability to re-invest** in portfolio of different rates.
- If mutually exclusive projects are considered as investment options which have considerably different cash outlays. A project with a larger fund commitment but lower IRR contributes more in terms of absolute NPV and increases the shareholders' wealth. In such situation **decisions based only on IRR criterion may not be correct.**

9.4 Discounted Payback Period Method

This is similar to Payback period as discussed in 7.8.1 under the non-discounting method except that the cash flows here are discounted at predetermined rate and the payback period so calculated is called **Discounted payback period**. One of the most popular economic criteria for evaluating capital projects is the payback period. Payback period is the time required for cumulative cash inflows to recover the cash outflows of the project.

This technique is considered superior to simple payback period method because it takes into account time value of money.

Example- 10

For example, a ₹ 30,000 cash outlay for a project with annual cash inflows of ₹ 6,000 would have a payback period of 5 years ($\text{₹ } 30,000 / \text{₹ } 6,000$).

The problem with the Payback Period is that it ignores the time value of money. In order to correct this, we can use discounted cash flows in calculating the payback period. Referring back to our example, if we discount the cash inflows at 15% required rate of return, we have:

Year	Cash Flow (₹)	PVF@15%	PV (₹)	Cumulative PV (₹)
1	6,000	0.870	5,220	5,220
2	6,000	0.756	4,536	9,756
3	6,000	0.658	3,948	13,704
4	6,000	0.572	3,432	17,136
5	6,000	0.497	2,982	20,118
6	6,000	0.432	2,592	22,710
7	6,000	0.376	2,256	24,966
8	6,000	0.327	1,962	26,928
9	6,000	0.284	1,704	28,632
10	6,000	0.247	1,482	30,114

The cumulative total of discounted cash flows after ten years is ₹ 30,114. Therefore, our discounted payback is approximately 10 years as opposed to 5 years under simple payback. It should be noted that **as the required rate of return increases, the distortion between simple payback and discounted payback grows.**

9.5 Modified Internal Rate of Return (MIRR)

As mentioned earlier, there are several limitations attached with the concept of the conventional Internal Rate of Return (IRR). The MIRR addresses some of these deficiencies e.g., it eliminates multiple IRR rates; it addresses **the reinvestment rate issue** and produces results which are consistent with the Net Present Value method. **This method is also called Terminal Value method.**

Under this method, all cash flows, apart from the initial investment, are brought to the terminal value using an appropriate discount rate (usually the Cost of Capital). This results in a single stream of cash inflow in the terminal year. **The MIRR is obtained by assuming a single outflow in the zeroth year and the terminal cash inflow as mentioned above. The discount rate which equates the present value of the terminal cash inflow to the zero year outflow is called the MIRR.**

The decision criterion of MIRR is same as IRR i.e. you accept an investment if MIRR is larger than required rate of return and reject if it is lower than the required rate of return.

ILLUSTRATION 9

An investment of ₹ 1,36,000 yields the following cash inflows (profits before depreciation but after tax). DETERMINE MIRR considering 8% as cost of capital.

Year	(₹)
1	30,000
2	40,000
3	60,000
4	30,000
5	20,000
	1,80,000

SOLUTION

Year 0 – Cash outflow = ₹ 1,36,000

The MIRR is calculated on the basis of investing the inflows at the cost of capital. The table below shows the value of the inflows, if they are immediately reinvested at 8%.

Year	Cash flow	@ 8% reinvestment rate factor	(₹)
1	30,000	1.3605*	40,815
2	40,000	1.2597	50,388
3	60,000	1.1664	69,984
4	30,000	1.0800	32,400
5	20,000	1.0000	20,000
			2,13,587

* Investment of ₹ 1 at the end of the year 1 is reinvested for 4 years (at the end of 5 years) shall become $1(1.08)^4 = 1.3605$. Similarly, reinvestment rate factor for remaining years shall be calculated. Please note that the investment at the end of 5th year shall be reinvested for zero year, hence, reinvestment rate factor shall be 1.

The total cash outflow in year 0 (₹ 1,36,000) is compared with the possible inflow at year 5 and the resulting figure = $\frac{1,36,000}{2,13,587} = 0.6367$ is the discount factor in year

5. By looking at the year 5 row in the present value tables, you will see that this gives a return of 9%. This means that the ₹ 2,13,587 received in year 5 is equivalent to ₹ 1,36,000 in year 0 if the discount rate is 9%. Alternatively, we can compute MIRR as follows:

$$\text{Total return} = \frac{2,13,587}{1,36,000} = 1.5705$$

$$\text{MIRR} = \sqrt[5]{1.5705} - 1 = 9\%.$$

9.6 Comparison of Net Present Value and Internal Rate of Return Methods

Similarity

- Both the net present value (NPV) and the internal rate of return (IRR) methods are discounted cash flow methods which consider the time value of money.
- Both the techniques consider all cash flows over the expected useful life of the investment.

9.7 Different conclusion in the following scenarios

There are circumstances/scenarios under which the net present value method and the internal rate of return methods will reach different conclusions. Let us discuss these scenarios:

Scenario 1 – Scale or Size Disparity

Being **IRR a relative measure** and **NPV an absolute measure** in case of disparity in scale or size both may give contradicting ranking. This can be understood with the help of following illustration:

ILLUSTRATION 10

Suppose there are two Project A and Project B are under consideration. The cash flows associated with these projects are as follows:

Year	Project A (₹)	Project B (₹)
0	(1,00,000)	(3,00,000)
1	50,000	1,40,000
2	60,000	1,90,000
3	40,000	1,00,000

Assuming Cost of Capital equal to 10%, IDENTIFY which project should be accepted as per NPV Method and IRR Method.

SOLUTION

Net Present Value (NPV) of Projects

Year	Cash Inflows of Project A (₹)	Cash Inflows of Project B (₹)	Present Value Factor @ 10%	PV of Project A (₹)	PV of Project B (₹)
0	(1,00,000)	(3,00,000)	1.000	(1,00,000)	(3,00,000)
1	50,000	1,40,000	0.909	45,450	1,27,260
2	60,000	1,90,000	0.826	49,560	1,56,940
3	40,000	1,00,000	0.751	30,040	75,100
NPV				25,050	59,300

Internal Rate of Returns (IRR) of projects

Since by discounting cash flows at 10%, we are getting values very far from zero. Therefore, let us discount cash flows using 20% discounting rate.

Year	Cash Inflows of Project A (₹)	Cash Inflows of Project B (₹)	Present Value Factor @ 20%	PV of Project A (₹)	PV of Project B (₹)
0	(1,00,000)	(3,00,000)	1.000	(1,00,000)	(3,00,000)
1	50,000	1,40,000	0.833	41,650	1,16,620
2	60,000	1,90,000	0.694	41,640	1,31,860
3	40,000	1,00,000	0.579	23,160	57,900
NPV				6,450	6,380

Even by discounting cash flows at 20%, we are getting values far from zero. Therefore, let us discount cash flows using 25% discounting rate.

Year	Cash Inflows of Project A (₹)	Cash Inflows of Project B (₹)	Present Value Factor @ 25%	PV of Project A (₹)	PV of Project B (₹)
0	(1,00,000)	(3,00,000)	1.000	(1,00,000)	(3,00,000)
1	50,000	1,40,000	0.800	40,000	1,12,000
2	60,000	1,90,000	0.640	38,400	1,21,600
3	40,000	1,00,000	0.512	20,480	51,200
NPV				(1,120)	(15,200)

The internal rate of return is, thus, more than 20% but less than 25%. The exact rate can be obtained by interpolation:

$$IRR_A = 20\% + \frac{6,450}{6,450 - (1,120)} \times (25\% - 20\%) = 20\% + \left(\frac{6,450}{7,570} \times 5\% \right) = 24.26\%$$

$$IRR_B = 20\% + \frac{6,380}{6,380 - (15,200)} \times (25\% - 20\%) = 20\% + \left(\frac{6,380}{21,580} \times 5\% \right) = 21.48\%$$

Overall Position

	Project A	Project B
NPV @ 10%	₹ 25,050	₹ 59,300
IRR	24.26%	21.48%

Thus, there is contradiction in ranking by two methods.

Scenario 2 – Time Disparity in Cash Flows

It might be possible that overall cash flows may be more or less same in the projects but there may be disparity in their flows i.e. larger part of cash inflows may be occurred in the beginning or end of the project. In such situation there may be difference in the ranking of projects as per two methods. This can be understood with the help of following illustration:

ILLUSTRATION 11

Suppose ABC Ltd. is considering two Project X and Project Y for investment. The cash flows associated with these projects are as follows:

Year	Project X (₹)	Project Y (₹)
0	(2,50,000)	(3,00,000)
1	2,00,000	50,000
2	1,00,000	1,00,000
3	50,000	3,00,000

Assuming Cost of Capital be 10%, IDENTIFY which project should be accepted as per NPV Method and IRR Method.

SOLUTION

Net Present Value of Projects

Year	Cash Inflows of Project X (₹)	Cash Inflows of Project Y (₹)	Present Value Factor @ 10%	PV of Project X (₹)	PV of Project Y (₹)
0	(2,50,000)	(3,00,000)	1.000	(2,50,000)	(3,00,000)
1	2,00,000	50,000	0.909	1,81,800	45,450
2	1,00,000	1,00,000	0.826	82,600	82,600
3	50,000	3,00,000	0.751	37,550	2,25,300
NPV				51,950	53,350

Internal Rate of Returns of projects

Since, by discounting cash flows at 10%, we are getting values far from zero. Therefore, let us discount cash flows using 20% discounting rate.

Year	Cash Inflows of Project X (₹)	Cash Inflows of Project Y (₹)	Present Value Factor @ 20%	PV of Project X (₹)	PV of Project Y (₹)
0	(2,50,000)	(3,00,000)	1.000	(2,50,000)	(3,00,000)
1	2,00,000	50,000	0.833	1,66,600	41,650
2	1,00,000	1,00,000	0.694	69,400	69,400
3	50,000	3,00,000	0.579	28,950	1,73,700
NPV				14,950	(15,250)

Since, by discounting cash flows at 20% we are getting that value of Project X is positive and value of Project Y is negative. Therefore, let us discount cash flows of Project X using 25% discounting rate and Project Y using discount rate of 15%.

Year	Cash Inflows of Project X (₹)	Present Value Factor @ 25%	PV of Project X (₹)	Cash Inflows of Project Y (₹)	Present Value Factor @ 15%	PV of Project Y (₹)
0	(2,50,000)	1.000	(2,50,000)	(3,00,000)	1.000	(3,00,000)
1	2,00,000	0.800	1,60,000	50,000	0.870	43,500
2	1,00,000	0.640	64,000	1,00,000	0.756	75,600
3	50,000	0.512	25,600	3,00,000	0.658	1,97,400
NPV			(400)			16,500

The internal rate can be obtained by interpolation:

$$\begin{aligned} \text{IRR}_X &= 20\% + \frac{14,950}{14,950 - (400)} \times (25\% - 20\%) \\ &= 20\% + \left(\frac{14,950}{15,350} \times 5\% \right) = 24.87\% \end{aligned}$$

$$\begin{aligned} \text{IRR}_B &= 15\% + \frac{16,500}{16,500 - (15,250)} \times (20\% - 15\%) \\ &= 15\% + \left(\frac{16,500}{31,750} \times 5\% \right) = 17.60\% \end{aligned}$$

Overall Position

	Project A	Project B
NPV @ 10%	₹ 51,950	₹ 53,350
IRR	24.87%	17.60%

Thus, there is contradiction in ranking by two methods.

Scenario 3 – Disparity in life of Proposals (Unequal Lives)

Conflict in ranking may also arise if we are comparing two projects (especially mutually exclusive) having unequal lives. This can be understood with the help of following illustration:

ILLUSTRATION 12

Suppose MVA Ltd. is considering two Project A and Project B for investment. The cash flows associated with these projects are as follows:

Year	Project A (₹)	Project B (₹)
0	(5,00,000)	(5,00,000)
1	7,50,000	2,00,000
2	0	2,00,000
3	0	7,00,000

Assuming Cost of Capital equal to 12%, ANALYSE which project should be accepted as per NPV Method and IRR Method?

SOLUTION**Net Present Value of Projects**

Year	Cash Inflows of Project A (₹)	Cash Inflows of Project B (₹)	Present Value Factor @ 12%	PV of Project A (₹)	PV of Project B (₹)
0	(5,00,000)	(5,00,000)	1.000	(5,00,000)	(5,00,000)
1	7,50,000	2,00,000	0.893	6,69,750	1,78,600
2	0	2,00,000	0.797	0	1,59,400
3	0	7,00,000	0.712	0	4,98,400
NPV				1,69,750	3,36,400

Internal Rate of Returns of projects

Let us discount cash flows using 50% discounting rate.

Year	Cash Inflows of Project A (₹)	Cash Inflows of Project B (₹)	Present Value Factor @ 50%	PV of Project A (₹)	PV of Project B (₹)
0	(5,00,000)	(5,00,000)	1.000	(5,00,000)	(5,00,000)

1	7,50,000	2,00,000	0.667	5,00,250	1,33,400
2	0	2,00,000	0.444	0	88,800
3	0	7,00,000	0.296	0	2,07,200
NPV				250	(70,600)

Since, IRR of project A shall be 50% as NPV is very small. Further, by discounting cash flows at 50%, we are getting NPV of Project B negative. Therefore, let us discount cash flows of Project B using 15% discounting rate.

Year	Cash Inflows of Project B (₹)	Present Value Factor @ 15%	PV of Project B (₹)
0	(5,00,000)	1.000	(5,00,000)
1	2,00,000	0.870	1,74,000
2	2,00,000	0.756	1,51,200
3	7,00,000	0.658	4,60,600
NPV			2,85,800

The internal rate can be obtained by interpolation:

$$\begin{aligned}
 \text{IRR}_B &= 15\% + \frac{2,85,800}{2,85,800 - (70,600)} \times (50\% - 15\%) \\
 &= 15\% + \left(\frac{2,85,800}{3,56,400} \times 35\% \right) = 43.07\%
 \end{aligned}$$

Overall Position

	Project A	Project B
NPV @ 12%	₹ 1,69,750	₹ 3,36,400
IRR	50.00%	43.07%

Thus, there is contradiction in ranking by two methods.



10. SUMMARY OF DECISION CRITERIA OF CAPITAL BUDGETING TECHNIQUES

Techniques		For Independent Project	For Mutually Exclusive Projects
Non-Discounted	Pay Back	(i) When Payback period \leq Maximum Acceptable Payback period: Accepted (ii) When Payback period $>$ Maximum Acceptable Payback period: Rejected	Project with least Payback period should be selected
	Accounting Rate of Return (ARR)	(i) When $ARR \geq$ Minimum Acceptable Rate of Return: Accepted (ii) When $ARR <$ Minimum Acceptable Rate of Return: Rejected	Project with the maximum ARR should be selected.
Discounted	Net Present Value (NPV)	(i) When $NPV \geq 0$: Accepted (ii) When $NPV < 0$: Rejected	Project with the highest positive NPV should be selected
	Profitability Index (PI)	(i) When $PI \geq 1$: Accepted (ii) When $PI < 1$: Rejected	When Net Present Value is same project with Highest PI should be selected
	Internal Rate of Return (IRR)	(i) When $IRR \geq K$: Accepted (ii) When $IRR < K$: Rejected	Project with the maximum IRR should be selected

11. SPECIAL CASES

11.1 Capital Budgeting under Capital Rationing

As discussed earlier, if project has positive NPV, it should be accepted with an objective of maximisation of wealth of shareholders. However, there may be a situation due to resource (capital) constraints (rationing) a firm may have to select some projects among various projects, all having positive NPVs. Broadly two scenarios may influence the method of evaluation to be adopted.

- (i) **Projects are independent of each other and are divisible in nature:** In such situation, NPV rule should be modified and accordingly projects should be ranked on the basis of 'NPV per rupee of Capital' method.
- (ii) **Projects are not divisible:** In such situation, projects shall be ranked on the basis of absolute NPV and should be mixed up to the point available resources are exhausted.

ILLUSTRATION 13

Shiva Limited is planning its capital investment programme for next year. It has five projects all of which give a positive NPV at the company cut-off rate of 15 percent, the investment outflows and present values being as follows:

Project	Investment (₹)	NPV @ 15% (₹)
A	(50,000)	15,400
B	(40,000)	18,700
C	(25,000)	10,100
D	(30,000)	11,200
E	(35,000)	19,300

The company is limited to a capital spending of ₹ 1,20,000.

You are required to ILLUSTRATE the returns from a package of projects within the capital spending limit. The projects are independent of each other and are divisible (i.e., part-project is possible).

SOLUTION**Computation of NPVs per ₹ 1 of Investment and Ranking of the Projects**

Project	Investment	NPV @ 15%	NPV per ₹ 1 invested	Ranking
	₹ '000	₹ '000		
A	(50)	15.4	0.31	5
B	(40)	18.7	0.47	2
C	(25)	10.1	0.40	3
D	(30)	11.2	0.37	4
E	(35)	19.3	0.55	1

Building up of a Programme of Projects based on their Rankings

Project	Investment	NPV @ 15%	
	₹ 000	₹ 000	
E	(35)	19.3	
B	(40)	18.7	
C	(25)	10.1	
D	(20)	7.5	(2/3 of project total)
	120	55.6	

Thus, Project A should be rejected and only two-third of Project D be undertaken. If the projects are not divisible then other combinations can be examined as:

	Investment	NPV @ 15%
	₹ 000	₹ 000
E + B + C	100	48.1
E + B + D	105	49.2

In this case E + B + D would be preferable as it provides a higher NPV despite D ranking lower than C.

11.2 Projects with unequal lives

Sometimes firm may be faced with any of the following problems:

- (i) **Retaining** an old asset **or replace** it with new one.

- (ii) Choosing one proposal among two proposals (**Mutually Exclusive**).

Although, while evaluating the proposals in the above scenarios, do not pose any special problem if they have same life period. But problem arises in case projects have unequal lives. In such situations we can deal with the problem by following any of the following method:

- (i) Replacement Chain Method
(ii) Equivalent Annualized Criterion

These two methods can be understood with the help of following illustration:

ILLUSTRATION 14

R Pvt. Ltd. is considering modernizing its production facilities and it has two proposals under consideration. The expected cash flows associated with these projects and their NPV as per discounting rate of 12% and IRR is as follows:

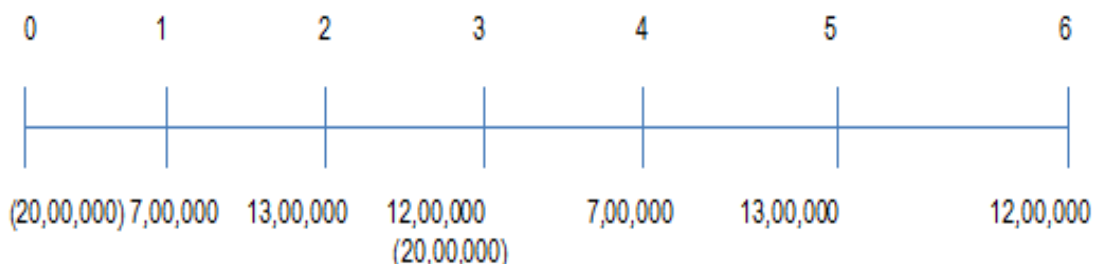
Year	Cash Flow	
	Project A (₹)	Project B (₹)
0	(40,00,000)	(20,00,000)
1	8,00,000	7,00,000
2	14,00,000	13,00,000
3	13,00,000	12,00,000
4	12,00,000	0
5	11,00,000	0
6	10,00,000	0
NPV @ 12%	6,49,094	5,15,488
IRR	17.47%	25.20%

IDENTIFY which project should R Pvt. Ltd. accept?

SOLUTION

Although from NPV point of view, Project A appears to be better but from IRR point of view, Project B appears to be better. Since, both projects have unequal lives, selection on the basis of these two methods shall not be proper. In such situation, we shall use any of the following method:

(i) Replacement Chain (Common Life) Method: Since the life of the Project A is 6 years and Project B is 3 years, to equalize lives, we can have second opportunity of investing in project B after one time investing. The position of cash flows in such situation shall be as follows:



NPV of extended life of 6 years of Project B shall be ₹ 8,82,403 and IRR of 25.20%. Accordingly, with extended life NPV of Project B it appears to be more attractive.

(ii) Equivalent Annualized Criterion: The method discussed above has one drawback when we have to compare two projects with one has a life of 3 years and other has 5 years. In such case, the above method shall require analysis of a period of 15 years i.e. common multiple of these two values. The simple solution to this problem is use of Equivalent Annualised Criterion involving following steps:

- Compute NPV using the WACC or discounting rate.
- Compute Present Value Annuity Factor (PVAf) of discounting factor used above for the period of each project.
- Divide NPV computed under step (a) by PVAf as computed under step (b) and compare the values.

Accordingly, for proposal under consideration:

	Project A	Project B
NPV @ 12%	₹ 6,49,094	₹ 5,15,488
PVAf @12%	4.112	2.402
Equivalent Annualized Criterion	₹ 1,57,854	₹ 2,14,608

Thus, Project B should be selected.

ILLUSTRATION 15

Alpha Company is considering the following investment projects:

Projects	Cash Flows (₹)			
	C ₀	C ₁	C ₂	C ₃
A	-10,000	+10,000		
B	-10,000	+7,500	+7,500	
C	-10,000	+2,000	+4,000	+12,000
D	-10,000	+10,000	+3,000	+3,000

- (a) ANALYSE and rank the projects according to each of the following methods: (i) Payback, (ii) ARR, (iii) IRR and (iv) NPV, assuming discount rates of 10 and 30 per cent.
- (b) Assuming the projects are independent, which one should be accepted? If the projects are mutually exclusive, IDENTIFY which project is the best?

SOLUTION**(a) (i) Payback Period**

$$\text{Project A: ₹ 10,000/₹ 10,000} = 1 \text{ year}$$

$$\text{Project B: ₹ 10,000/₹ 7,500} = 1\frac{1}{3} \text{ years}$$

$$\text{Project C: 2 years} + \frac{\text{₹ 10,000} - \text{₹ 6,000}}{\text{₹ 12,000}} = 2\frac{1}{3} \text{ years}$$

$$\text{Project D: 1 year}$$

(ii) ARR (Figures in ₹)

$$\text{Project A: } \frac{(10,000 - 10,000)1/2}{(10,000)1/2} = 0$$

$$\text{Project B: } \frac{(15,000 - 10,000)1/2}{(10,000)1/2} = \frac{2,500}{5,000} = 50\%$$

$$\text{Project C: } \frac{(18,000 - 10,000)1/3}{(10,000)1/2} = \frac{2,667}{5,000} = 53\%$$

$$\text{Project D: } \frac{(16,000 - 10,000)1/3}{(10,000)1/2} = \frac{2,000}{5,000} = 40\%$$

Note: This net cash proceed includes recovery of investment also. Therefore, net cash earnings are found by deducting initial investment.

(iii) IRR

Project A:	The net cash proceeds in year 1 are just equal to investment. Therefore, $r = 0\%$.
Project B:	This project produces an annuity of ₹ 7,500 for two years. Therefore, the required PVAF is: $\text{₹ } 10,000 / \text{₹ } 7,500 = 1.33$. This factor is found under 32% column. Therefore, $r = 32\%$
Project C:	Since cash flows are uneven, the trial and error method will be followed. Using 20% rate of discount, the NPV is + ₹ 1,389. At 30% rate of discount, the NPV is - ₹ 633. The true rate of return should be less than 30%. At 27% rate of discount, it is found that the NPV is - ₹ 86 and + ₹ 105 at 26%. Through interpolation, we find $r = 26.5\%$
Project D:	In this case also by using the trial and error method, it is found that at 37.6% rate of discount, NPV becomes almost zero. Therefore, $r = 37.6\%$.

(iv) NPV

Project A:

at 10% $-10,000 + 10,000 \times 0.909 = -910$

at 30% $-10,000 + 10,000 \times 0.769 = -2,310$

Project B:

at 10% $-10,000 + 7,500(0.909 + 0.826) = +3,013$

at 30% $-10,000 + 7,500(0.769 + 0.592) = +208$

Project C:

at 10% $-10,000 + 2,000 \times 0.909 + 4,000 \times 0.826 + 12,000 \times 0.751 = +4,134$

at 30% $-10,000 + 2,000 \times 0.769 + 4,000 \times 0.592 + 12,000 \times 0.455 = -633$

Project D:

at 10% $-10,000 + 10,000 \times 0.909 + 3,000 \times (0.826 + 0.751) = +3,821$

at 30% $-10,000 + 10,000 \times 0.769 + 3,000 \times (0.592 + 0.455) = +831$

The projects are ranked as follows according to the various methods:

Projects	PBP	ARR	IRR	NPV (10%)	NPV (30%)
A	1	4	4	4	4
B	2	2	2	3	2
C	3	1	3	1	3
D	1	3	1	2	1

- (b) Payback and ARR are theoretically unsound method for choosing between the investment projects. Between the two time-adjusted (DCF) investment criteria, NPV and IRR, NPV gives consistent results. If the projects are independent (and there is no capital rationing), either IRR or NPV can be used since the same set of projects will be accepted by any of the methods. In the present case, except Project A all the three projects should be accepted if the discount rate is 10%. Only Projects B and D should be undertaken if the discount rate is 30%.

If it is assumed that the projects are mutually exclusive, then under the assumption of 30% discount rate, the choice is between B and D (A and C are unprofitable). Both criteria IRR and NPV give the same results – D is the best. Under the assumption of 10% discount rate, ranking according to IRR and NPV conflict (except for Project A). If the IRR rule is followed, Project D should be accepted. But the NPV rule tells that Project C is the best. The NPV rule generally gives consistent results in conformity with the wealth maximization principle. Therefore, Project C should be accepted following the NPV rule.

ILLUSTRATION 16

The expected cash flows of three projects are given below. The cost of capital is 10 per cent.

- (a) CALCULATE the payback period, net present value, internal rate of return and accounting rate of return of each project.
- (b) IDENTIFY the rankings of the projects by each of the four methods.

(₹ in '000)

Period	Project A (₹)	Project B (₹)	Project C (₹)
0	(5,000)	(5,000)	(5,000)
1	900	700	2,000
2	900	800	2,000
3	900	900	2,000
4	900	1,000	1,000
5	900	1,100	
6	900	1,200	
7	900	1,300	
8	900	1,400	
9	900	1,500	
10	900	1,600	

SOLUTION**(a) Payback Period Method:**

$$A = 5 + (500/900) = 5.56 \text{ years}$$

$$B = 5 + (500/1,200) = 5.42 \text{ years}$$

$$C = 2 + (1,000/2,000) = 2.5 \text{ years}$$

Net Present Value Method:

$$NPV_A = (-5,000) + (900 \times 6.145) = (-5,000) + 5,530.5 = ₹ 530.5$$

NPV_B is calculated as follows:

Year	Cash flow (₹)	10% discount factor	Present value (₹)
0	(5000)	1.000	(5,000)
1	700	0.909	636
2	800	0.826	661
3	900	0.751	676
4	1000	0.683	683

5	1100	0.621	683
6	1200	0.564	677
7	1300	0.513	667
8	1400	0.467	654
9	1500	0.424	636
10	1600	0.386	618
			1591

NPV_C is calculated as follows:

Year	Cash flow (₹)	10% discount factor	Present value (₹)
0	(5000)	1.000	(5,000)
1	2000	0.909	1,818
2	2000	0.826	1,652
3	2000	0.751	1,502
4	1000	0.683	683
			655

Internal Rate of Return

Project A

$$\text{NPV at 12\%} = (5,000) + 900 \times 5.650$$

$$= (5,000) + 5085 = 85$$

$$\text{NPV at 13\%} = (5,000) + 900 \times 5.426$$

$$= (5,000) + 4,883.40 = -116.60$$

$$\text{IRR}_A = 12 + \left[\frac{85}{85 + 116.60} \right] \times (13 - 12) = 12 + 0.42$$

$$= 12.42\%.$$

Project BIRR_B

Year	Cash flow (₹)	10% discount factor	Present value (₹)	16% discount factor	Present value (₹)
0	(5,000)	1.000	(5,000)	1.000	(5,000)
1	700	0.909	636	0.862	603
2	800	0.826	661	0.743	595
3	900	0.751	676	0.641	577
4	1,000	0.683	683	0.552	552
5	1,100	0.621	683	0.476	524
6	1,200	0.564	677	0.410	493
7	1,300	0.513	667	0.354	460
8	1,400	0.467	654	0.305	427
9	1,500	0.424	636	0.263	394
10	1,600	0.386	618	0.227	363
			1,591		(12)

Interpolating: $IRR_B = 10\% + \frac{1,591}{(1,591 + 12)} \times (16\% - 10\%) = 10\% + 5.94\% = 15.94\%$

Project CIRR_C

Year	Cash flow (₹)	15% discount factor	Present value (₹)	18% discount factor	Present value (₹)
0	(5,000)	1.000	(5,000)	1.000	(5,000)
1	2,000	0.870	1,740	0.847	1,694
2	2,000	0.756	1,512	0.718	1,436
3	2,000	0.658	1,316	0.609	1,218
4	1,000	0.572	572	0.516	516
			140		(136)

Interpolating: $IRR_C = 15\% + \frac{140}{(140 + 136)} \times (18\% - 15\%) = 15\% + 1.52\% = 16.52\%$

Accounting Rate of Return:

ARR_A : Average capital employed = $\frac{5,000}{2} = ₹ 2,500$

Average accounting profit = $\frac{(9,000 - 5,000)}{10} = ₹ 400$

$ARR_A = \frac{(400 \times 100)}{2,500} = 16 \text{ per cent}$

ARR_B : Average accounting profit = $\frac{(11,500 - 5,000)}{10} = ₹ 650$

$ARR_B = \frac{(650 \times 100)}{2,500} = 26 \text{ per cent}$

ARR_C : Average accounting profit = $\frac{(7,000 - 5,000)}{4} = ₹ 500$

$ARR_C = \frac{(500 \times 100)}{2,500} = 20 \text{ per cent}$

(b) Summary of Results

	A	B	C
Payback (years)	5.5	5.4	2.5
NPV (₹)	530.50	1,591	655
IRR (%)	12.42	15.94	16.52
ARR (%)	16	26	20

Comparison of Rankings

Method	Payback	NPV	IRR	ARR
1	C	B	C	B
2	B	C	B	C
3	A	A	A	A

ILLUSTRATION 17

X Limited is considering purchasing of new plant worth ₹ 80,00,000. The expected net cash flows after taxes and before depreciation are as follows:

Year	Net Cash Flows (₹)
1	14,00,000
2	14,00,000
3	14,00,000
4	14,00,000
5	14,00,000
6	16,00,000
7	20,00,000
8	30,00,000
9	20,00,000
10	8,00,000

The rate of cost of capital is 10%.

You are required to CALCULATE:

- (i) *Pay-back period*
- (ii) *Net present value at 10 discount factor*
- (iii) *Profitability index at 10 discount factor*
- (iv) *Internal rate of return with the help of 10% and 15% discount factor*

The following present value table is given for you:

Year	Present value of ₹ 1 at 10% discount rate	Present value of ₹ 1 at 15% discount rate
1	0.909	0.87
2	0.826	0.756
3	0.751	0.658
4	0.683	0.572
5	0.621	0.497

6	0.564	0.432
7	0.513	0.376
8	0.467	0.327
9	0.424	0.284
10	0.386	0.247

SOLUTION**(i) Calculation of Pay-back Period**

Cash Outlay of the Project = ₹ 80,00,000

Total Cash Inflow for the first five years = ₹ 70,00,000

Balance of cash outlay left to be paid back in the 6th year = ₹ 10,00,000

Cash inflow for 6th year = ₹ 16,00,000

So, the payback period is between 5th and 6th years, i.e.,

$$5 \text{ years} + \frac{\text{₹}10,00,000}{\text{₹}16,00,000} = 5.625 \text{ years or } 5 \text{ years } 7.5 \text{ months}$$

(ii) Calculation of Net Present Value (NPV) @10% discount rate:

Year	Net Cash Inflow (₹)	Present Value at Discount Rate of 10%	Present Value (₹)
	(a)	(b)	(c) = (a) × (b)
1	14,00,000	0.909	12,72,600
2	14,00,000	0.826	11,56,400
3	14,00,000	0.751	10,51,400
4	14,00,000	0.683	9,56,200
5	14,00,000	0.621	8,69,400
6	16,00,000	0.564	9,02,400
7	20,00,000	0.513	10,26,000
8	30,00,000	0.467	14,01,000
9	20,00,000	0.424	8,48,000
10	8,00,000	0.386	3,08,800
			97,92,200

$$\begin{aligned}\text{Net Present Value (NPV)} &= \text{Cash Outflow} - \text{Present Value of Cash Inflows} \\ &= ₹ 80,00,000 - ₹ 97,92,200 = 17,92,200\end{aligned}$$

(iii) Calculation of Profitability Index @ 10% discount rate:

$$\begin{aligned}\text{Profitability Index} &= \frac{\text{Present Value of Cash inflows}}{\text{Cost of the investment}} \\ &= \frac{₹ 97,92,200}{₹ 80,00,000} = 1.224\end{aligned}$$

(iv) Calculation of Internal Rate of Return:

Net present value @ 10% interest rate factor has already been calculated in (ii) above, we will calculate Net present value @15% rate factor.

Year	Net Cash Inflow (₹)	Present Value at Discount Rate of 15%	Present Value (₹)
	(a)	(b)	(c) = (a) × (b)
1	14,00,000	0.870	12,18,000
2	14,00,000	0.756	10,58,400
3	14,00,000	0.658	9,21,200
4	14,00,000	0.572	8,00,800
5	14,00,000	0.497	6,95,800
6	16,00,000	0.432	6,91,200
7	20,00,000	0.376	7,52,000
8	30,00,000	0.327	9,81,000
9	20,00,000	0.284	5,68,000
10	8,00,000	0.247	1,97,600
			78,84,000

$$\text{Net Present Value at 15\%} = ₹ 78,84,000 - ₹ 80,00,000 = ₹ -1,16,000$$

As the net present value @ 15% discount rate is negative, hence internal rate of return falls in between 10% and 15%. The correct internal rate of return can be calculated as follows:

$$\text{IRR} = L + \frac{\text{NPV}_L}{\text{NPV}_L - \text{NPV}_H} (H - L)$$

$$\begin{aligned}
 &= 10\% + \frac{\text{₹}17,92,200}{\text{₹}17,92,200 - (-\text{₹}1,16,000)} (15\% - 10\%) \\
 &= 10\% + \frac{\text{₹}17,92,200}{\text{₹}19,08,200} \times 5\% = 14.7\%
 \end{aligned}$$

ILLUSTRATION 18

HMR Ltd. is considering replacing a manually operated old machine with a fully automatic new machine. The old machine had been fully depreciated for tax purpose but has a book value of ₹2,40,000 on 31st March. The machine has begun causing problems with breakdowns and it cannot fetch more than ₹30,000 if sold in the market at present. It will have no realizable value after 10 years. The company has been offered ₹1,00,000 for the old machine as a trade in on the new machine which has a price (before allowance for trade in) of ₹4,50,000. The expected life of new machine is 10 years with salvage value of ₹35,000.

Further, the company follows straight line depreciation method but for tax purpose, written down value method depreciation @ 7.5% is considering that this is the only machine in the block of assets.

Given below are the expected sales and costs from both old and new machine:

	Old machine (₹)	New machine (₹)
Sales	8,10,000	8,10,000
Material cost	1,80,000	1,26,250
Labour cost	1,35,000	1,10,000
Variable overhead	56,250	47,500
Fixed overhead	90,000	97,500
Depreciation	24,000	41,500
PBT	3,24,750	3,87,250
Tax @ 30%	97,425	1,16,175
PAT	2,27,325	2,71,075

From the above information, ANALYSE whether the old machine should be replaced or not if required rate of return is 10%? Ignore capital gain tax.

PV factors @ 10%:

Year	1	2	3	4	5	6	7	8	9	10
PVF	0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467	0.424	0.386

SOLUTION

Workings:

1. Calculation of Base for depreciation or Cost of New Machine

Particulars	(₹)
Purchase price of new machine	4,50,000
Less: Sale price of old machine	1,00,000
	3,50,000

2. Calculation of Profit before tax as per books

Particulars	Old machine (₹)	New machine (₹)	Difference (₹)
PBT as per books	3,24,750	3,87,250	62,500
Add: Depreciation as per books	24,000	41,500	17,500
Profit before tax and depreciation (PBT)	3,48,750	4,28,750	80,000

Calculation of Incremental NPV

Year	PVF @ 10%	PBT (₹)	Dep. @ 7.5% (₹)	PBT (₹)	Tax @ 30% (₹)	Cash Inflows (₹)	PV of Cash Inflows (₹)
	(1)	(2)	(3)	(4)	(5) = (4) x 0.30	(6) = (4) – (5) + (3)	(7) = (6) x (1)
1	0.909	80,000.00	26,250.00	53,750.00	16,125.00	63,875.00	58,062.38
2	0.826	80,000.00	24,281.25	55,718.75	16,715.63	63,284.38	52,272.89
3	0.751	80,000.00	22,460.16	57,539.84	17,261.95	62,738.05	47,116.27
4	0.683	80,000.00	20,775.64	59,224.36	17,767.31	62,232.69	42,504.93
5	0.621	80,000.00	19,217.47	60,782.53	18,234.76	61,765.24	38,356.21
6	0.564	80,000.00	17,776.16	62,223.84	18,667.15	61,332.85	34,591.73
7	0.513	80,000.00	16,442.95	63,557.05	19,067.12	60,932.88	31,258.57

8	0.467	80,000.00	15,209.73	64,790.27	19,437.08	60,562.92	28,282.88
9	0.424	80,000.00	14,069.00	65,931.00	19,779.30	60,220.70	25,533.58
10	0.386	80,000.00	13,013.82	66,986.18	20,095.85	59,904.15	23,123.00
							3,81,102.44
Add: PV of Salvage value of new machine ($\text{₹ } 35,000 \times 0.386$)							13,510.00
Total PV of incremental cash inflows							3,94,612.44
Less: Cost of new machine							3,50,000.00
Incremental Net Present Value							44,612.44

Analysis: Since the Incremental NPV is positive, the old machine should be replaced.

SUMMARY

- ♦ **Capital budgeting** is the process of evaluating and selecting long-term investments that are in line with the goal of investor's wealth maximization.
- ♦ The capital budgeting decisions are important, crucial and critical business decisions due to substantial expenditure involved; long period for the recovery of benefits; irreversibility of decisions and the complexity involved in capital investment decisions.
- ♦ One of the most important tasks in capital budgeting is estimating future cash flows for a project. The final decision we make at the end of the capital budgeting process is no better than the accuracy of our cash-flow estimates.
- ♦ Tax payments like other payments must be properly deducted in deriving the cash flows. That is, cash flows must be defined in post-tax terms.
- ♦ There are a number of capital budgeting techniques available for appraisal of investment proposals and can be classified as traditional (non-discounted) and time-adjusted (discounted).
- ♦ The most common traditional capital budgeting techniques are Payback Period and Accounting (Book) Rate of Return.

$$\diamond \quad \text{Payback Period} = \frac{\text{Total initial capital investment}}{\text{Annual expected after-tax net cash flow}}$$

$$\text{Payback Reciprocal} = \frac{\text{Average Annual cash in flow}}{\text{Initial investment}}$$

$$\diamond \quad \text{Accounting rate of return (ARR)} = \frac{\text{Average annual net income}}{\text{Investment}}$$

♦ **Net Present Value Technique (NPV):**

Net present value = Present value of cash inflows - Present value of cash outflows

$$\text{Or, NPV} = \left(\frac{C_1}{(1+k)} + \frac{C_2}{(1+k)^2} + \frac{C_3}{(1+k)^3} + \dots + \frac{C_n}{(1+k)^n} \right) - I$$

♦ **Profitability Index /Desirability Factor/Present Value Index Method (PI):**

$$\text{Profitability Index (PI)} = \frac{\text{Sum of discounted cash in flows}}{\text{Initial cash outlay or Total discounted cash outflow (as the case may)}}$$

♦ **Internal Rate of Return Method (IRR):**

$$LR + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} \times (\text{HR} - \text{LR})$$

- ♦ **Modified Internal Rate of Return (MIRR):** All cash flows, apart from the initial investment, are brought to the terminal value using an appropriate discount rate (usually the Cost of Capital).

TEST YOUR KNOWLEDGE

Multiple Choice Questions (MCQs)

1. A capital budgeting technique which does not require the computation of cost of capital for decision making purposes is:
 - (a) Net Present Value method
 - (b) Internal Rate of Return method
 - (c) Modified Internal Rate of Return method

- (d) *Payback Period method*
- 2. *If two alternative proposals are such that the acceptance of one shall exclude the possibility of the acceptance of another then such decision making will lead to:*
 - (a) *Mutually exclusive decisions*
 - (b) *Accept reject decisions*
 - (c) *Contingent decisions*
 - (d) *None of the above*
- 3. *In case a company considers a discounting factor higher than the cost of capital for arriving at present values, the present values of cash inflows will be:*
 - (a) *Less than those computed on the basis of cost of capital*
 - (b) *More than those computed on the basis of cost of capital*
 - (c) *Equal to those computed on the basis of the cost of capital*
 - (d) *None of the above*
- 4. *If the cut off rate of a project is greater than IRR, we may:*
 - (a) *Accept the proposal*
 - (b) *Reject the proposal*
 - (c) *Be neutral about it*
 - (d) *Wait for the IRR to increase and match the cut off rate*
- 5. *While evaluating capital investment proposals, time value of money is used in which of the following techniques:*
 - (a) *Payback Period method*
 - (b) *Accounting rate of return*
 - (c) *Net present value*
 - (d) *None of the above*
- 6. *IRR would favour project proposals which have:*
 - (a) *Heavy cash inflows in the early stages of the project.*

- (b) *Evenly distributed cash inflows throughout the project.*
 - (c) *Heavy cash inflows at the later stages of the project.*
 - (d) *None of the above.*
7. *The re-investment assumption in the case of the IRR technique assumes that:*
- (a) *Cash flows can be re-invested at the projects IRR.*
 - (b) *Cash flows can be re-invested at the weighted cost of capital.*
 - (c) *Cash flows can be re-invested at the marginal cost of capital.*
 - (d) *None of the above*
8. *Multiple IRRs are obtained when:*
- (a) *Cash flows in the early stages of the project exceed cash flows during the later stages.*
 - (b) *Cash flows reverse their signs during the project.*
 - (c) *Cash flows are uneven.*
 - (d) *None of the above.*
9. *Depreciation is included as a cost in which of the following techniques:*
- (a) *Accounting rate of return*
 - (b) *Net present value*
 - (c) *Internal rate of return*
 - (d) *None of the above*
10. *Management is considering a ₹ 1,00,000 investment in a project with a 5 year life and no residual value. If the total income from the project is expected to be ₹ 60,000 and recognition is given to the effect of straight line depreciation on the investment, the average rate of return is:*
- (a) *12%*
 - (b) *24%*
 - (c) *60%*
 - (d) *75%*

11. Assume cash outflow equals ₹1,20,000 followed by cash inflows of ₹25,000 per year for 8 years and a cost of capital of 11%. What is the Net present value?
- (a) (₹38,214)
 - (b) ₹9,653
 - (c) ₹8,653
 - (d) ₹38,214
12. What is the Internal rate of return for a project having cash flows of ₹40,000 per year for 10 years and a cost of ₹2,26,009?
- (a) 8%
 - (b) 9%
 - (c) 10%
 - (d) 12%
13. While evaluating investments, the release of working capital at the end of the project's life should be considered as:
- (a) Cash inflow
 - (b) Cash outflow
 - (c) Having no effect upon the capital budgeting decision
 - (d) None of the above
14. Capital rationing refers to a situation where:
- (a) Funds are restricted and the management has to choose from amongst available alternative investments.
 - (b) Funds are unlimited and the management has to decide how to allocate them to suitable projects.
 - (c) Very few feasible investment proposals are available with the management.
 - (d) None of the above.
15. Capital budgeting is done for:
- (a) Evaluating short term investment decisions.

- (b) Evaluating medium term investment decisions.
- (c) Evaluating long term investment decisions.
- (d) None of the above.

Theoretical Questions

1. DISCUSS the various techniques of capital budgeting.
2. DISCUSS NPV. How is it calculated?
3. DISCUSS in detail the 'Capital Budgeting Process'.
4. CLASSIFY various types of Capital Investment decisions known to you.
5. DESCRIBE the advantages and disadvantages of profitability of index.
6. DESCRIBE MIRR.

Practical Problems

1. Following data has been available for a capital project:

Annual cash inflows ₹ 1,00,000

Useful life 4 years

Salvage value 0

Internal rate of return 12%

Profitability index 1.064

You are required to CALCULATE the following for this project:

- (i) Cost of project
- (ii) Cost of capital
- (iii) Net present value
- (iv) Payback period

PV factors at different rates are given below:

Discount factor	12%	11%	10%	9%
1 year	0.893	0.901	0.909	0.917
2 year	0.797	0.812	0.826	0.842
3 year	0.712	0.731	0.751	0.772

4 year	0.636	0.659	0.683	0.708
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2. Lockwood Limited wants to replace its old machine with a new automatic machine. Two models A and B are available at the same cost of ₹5 lakhs each. Salvage value of the old machine is ₹1 lakh. The utilities of the existing machine can be used if the company purchases model A. Additional cost of utilities to be purchased in this case will be ₹1 lakh. If the company purchases B, then all the existing utilities will have to be replaced with new utilities costing ₹2 lakhs. The salvage value of the old utilities will be ₹0.20 lakhs. The cash flows are expected to be:

Year	Cash inflows of A (₹)	Cash inflows of B (₹)	P.V. Factor @ 15%
1	1,00,000	2,00,000	0.870
2	1,50,000	2,10,000	0.756
3	1,80,000	1,80,000	0.658
4	2,00,000	1,70,000	0.572
5	1,70,000	40,000	0.497
Salvage Value at the end of Year 5	50,000	60,000	

The targeted return on capital is 15%. You are required to (i) COMPUTE, for the two machines separately, net present value, discounted payback period and desirability factor and (ii) STATE which of the machines is to be selected?

3. Hindlever Company is considering a new product line to supplement its range of products. It is anticipated that the new product line will involve cash investments of ₹7,00,000 at time 0 and ₹10,00,000 in year 1. After-tax cash inflows of ₹2,50,000 are expected in year 2, ₹3,00,000 in year 3, ₹3,50,000 in year 4 and ₹4,00,000 each year thereafter through year 10. Although the product line might be viable even after year 10, the company prefers to be conservative and end all calculations at that time.
- If the required rate of return is 15 per cent, COMPUTE net present value of the project. Is it acceptable?
 - ANALYSE what would be the case if the required rate of return were 10 per cent.
 - CALCULATE its internal rate of return.

(d) COMPUTE the project's payback period.

4. Elite Cooker Company is evaluating three investment situations: (1) Produce a new line of aluminium skillets, (2) Expand its existing cooker line to include several new sizes, and (3) Develop a new, higher-quality line of cookers. If only the project in question is undertaken, the expected present values and the amounts of investment required are:

Project	Investment required	Present value of Future Cash-Flows
	₹	₹
1	2,00,000	2,90,000
2	1,15,000	1,85,000
3	2,70,000	4,00,000

If projects 1 and 2 are jointly undertaken, there will be no economies; the investments required and present values will simply be the sum of the parts. With projects 1 and 3, economies are possible in investment because one of the machines acquired can be used in both production processes. The total investment required for projects 1 and 3 combined is ₹ 4,40,000. If projects 2 and 3 are undertaken, there are economies to be achieved in marketing and producing the products but not in investment. The expected present value of future cash flows for projects 2 and 3 is ₹ 6,20,000. If all three projects are undertaken simultaneously, the economies noted will still hold. However, a ₹ 1,25,000 extension on the plant will be necessary, as space is not available for all three projects. CALCULATE NPV of the projects and STATE which project or projects should be chosen?

5. Cello Limited is considering buying a new machine which would have a useful economic life of five years, a cost of ₹ 1,25,000 and a scrap value of ₹ 30,000, with 80 per cent of the cost being payable at the start of the project and 20 per cent at the end of the first year. The machine would produce 50,000 units per annum of a new product with an estimated selling price of ₹ 3 per unit. Direct costs would be ₹ 1.75 per unit and annual fixed costs, including depreciation calculated on a straight-line basis, would be ₹ 40,000 per annum.

In the first year and the second year, special sales promotion expenditure, not included in the above costs, would be incurred, amounting to ₹ 10,000 and ₹ 15,000 respectively.

CALCULATE NPV of the project for investment appraisal, assuming that the company's cost of capital is 10 percent.

6. Ae Bee Cee Ltd. is planning to invest in machinery, for which it has to make a choice between the two identical machines, in terms of Capacity, 'X' and 'Y'. Despite being designed differently, both machines do the same job. Further, details regarding both the machines are given below:

Particulars	Machine 'X'	Machine 'Y'
Purchase Cost of the Machine (₹)	15,00,000	10,00,000
Life (years)	3	2
Running cost per year (₹)	4,00,000	6,00,000

The opportunity cost of capital is 9%.

You are required to IDENTIFY the machine which the company should buy?

The present value (PV) factors at 9% are:

Year	t_1	t_2	t_3
$PVIF_{0.09,t}$	0.917	0.842	0.772

7. Alley Pvt. Ltd. is planning to invest in a machinery that would cost ₹ 1,00,000 at the beginning of year 1. Net cash inflows from operations have been estimated at ₹ 36,000 per annum for 3 years. The company has two options for smooth functioning of the machinery - one is service, and another is replacement of parts. If the company opts to service a part of the machinery at the end of year 1 at ₹ 20,000, in such a case, the scrap value at the end of year 3 will be ₹ 25,000. However, if the company decides not to service the part, then it will have to be replaced at the end of year 2 at ₹ 30,800, and in this case, the machinery will work for the 4th year also and get operational cash inflow of ₹ 36,000 for the 4th year. It will have to be scrapped at the end of year 4 at ₹ 18,000.

Assuming cost of capital at 10% and ignoring taxes, DETERMINE the purchase of this machinery based on the net present value of its cash flows.

If the supplier gives a discount of ₹ 10,000 for purchase, what would be your decision?

Note: The PV factors at 10% are:

Year	0	1	2	3	4	5	6
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PV Factor	1	0.9091	0.8264	0.7513	0.6830	0.6209	0.5645
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8. NavJeevani hospital is considering to purchase a machine for medical projectional radiography which is priced at ₹ 2,00,000. The projected life of the machine is 8 years and has an expected salvage value of ₹ 18,000 at the end of 8th year. The annual operating cost of the machine is ₹ 22,500. It is expected to generate revenues of ₹ 1,20,000 per year for eight years. Presently, the hospital is outsourcing the radiography work to its neighbour Test Center and is earning commission income of ₹ 36,000 per annum, net of taxes.

Required:

ANALYSE whether it would be profitable for the hospital to purchase the machine. Give your recommendation under:

- (i) Net Present Value method
- (ii) Profitability Index method

Consider tax @30%. PV factors at 10% are given below:

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
0.909	0.826	0.751	0.683	0.621	0.564	0.513	0.467

9. XYZ Ltd. is planning to introduce a new product with a project life of 8 years. Initial equipment cost will be ₹ 3.5 crores. Additional equipment costing ₹ 25,00,000 will be purchased at the end of the third year from the cash inflow of this year. At the end of 8 years, the original equipment will have no resale value, but additional equipment can be sold for ₹ 2,50,000. A working capital of ₹ 40,00,000 will be needed and it will be released at the end of eighth year. The project will be financed with sufficient amount of equity capital.

The sales volumes over eight years have been estimated as follows:

Year	1	2	3	4 – 5	6 – 8
Units per year	72,000	1,08,000	2,60,000	2,70,000	1,80,000

A sales price of ₹ 240 per unit is expected and variable expenses will amount to 60% of sales revenue. Fixed cash operating costs will amount ₹ 36,00,000 per year. The loss of any year will be set off from the profits of subsequent two years. The company is subject to 30 per cent tax rate and considers 12 per cent to be an

appropriate after-tax cost of capital for this project. The company follows straight line method of depreciation.

CALCULATE the net present value of the project and advise the management to take appropriate decision.

The PV factors at 12% are

Year	1	2	3	4	5	6	7	8
PV Factor	0.893	0.797	0.712	0.636	0.567	0.507	0.452	0.404

10. A large profit making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing process to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment by the company of ₹ 150 lakh per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of ₹ 90 lakh before the processing operation starts. This compensation is not allowed as deduction for tax purposes.

The machine required for carrying out the processing will cost ₹ 600 lakh. At the end of the 4th year, the machine can be sold for ₹ 60 lakh and the cost of dismantling and removal will be ₹ 45 lakh.

Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

(₹ In lakh)

Year	1	2	3	4
Sales	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	225	225	255	300
Other expenses	120	135	162	210
Factory overheads	165	180	330	435
Depreciation (as per income tax rules)	150	114	84	63

Initial stock of materials required before commencement of the processing operations is ₹ 60 lakh at the start of year 1. The stock levels of materials to be maintained at the end of year 1, 2 and 3 will be ₹ 165 lakh and the stocks at the end of year 4 will be nil. The storage of materials will utilise space which would otherwise have been rented out for ₹ 30 lakh per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of ₹ 45 lakh in the year- 1 and ₹ 30 lakh in the year- 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of ₹ 90 lakh per annum payable on this venture. The company's tax rate is 30%.

Consider cost of capital @ 14%, the present value factors of which is given below for four years:

Year	1	2	3	4
PV factors @14%	0.877	0.769	0.674	0.592

ADVISE the management on the desirability of installing the machine for processing the waste. All calculations should form part of the answer.

11. Xavly Ltd. has a machine which has been in operation for 3 years. The machine has a remaining estimated useful life of 5 years with no salvage value in the end. Its current market value is ₹ 2,00,000. The company is considering a proposal to purchase a new model of machine to replace the existing machine. The relevant information is as follows:

	Existing Machine	New Machine
Cost of machine	₹ 3,30,000	₹ 10,00,000
Estimated life	8 years	5 years
Salvage value	Nil	₹ 40,000
Annual output	30,000 units	75,000 units
Selling price per unit	₹ 15	₹ 15
Annual operating hours	3,000	3,000
Material cost per unit	₹ 4	₹ 4
Labour cost per hour	₹ 40	₹ 70
Indirect cash cost per annum	₹ 50,000	₹ 65,000

The company uses written down value of depreciation @ 20% and it has several other machines in the block of assets. The Income tax rate is 30 per cent and Xavly Ltd. does not make any investment, if it yields less than 12 per cent.

ADVISE Xavly Ltd. whether the existing machine should be replaced or not.

PV factors @12%:

Year	1	2	3	4	5
PVF	0.893	0.797	0.712	0.636	0.567

12. A & Co. is contemplating whether to replace an existing machine or to spend money on overhauling it. A & Co. currently pays no taxes. The replacement machine costs ₹ 90,000 now and requires maintenance of ₹ 10,000 at the end of every year for eight years. At the end of eight years it would have a salvage value of ₹ 20,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value falls each year as follows:

Year	Maintenance (₹)	Salvage (₹)
Present	0	40,000
1	10,000	25,000
2	20,000	15,000
3	30,000	10,000
4	40,000	0

The opportunity cost of capital for A & Co. is 15%.

REQUIRED:

When should the company replace the machine?

(Note: Present value of an annuity of Re. 1 per period for 8 years at interest rate of 15% : 4.4873; present value of Re. 1 to be received after 8 years at interest rate of 15% : 0.3269).

13. A chemical company is presently paying an outside firm ₹ 1 per gallon to dispose off the waste resulting from its manufacturing operations. At normal operating capacity, the waste is about 50,000 gallons per year.

After spending ₹ 60,000 on research, the company discovered that the waste could be sold for ₹ 10 per gallon if it was processed further. Additional processing would,

however, require an investment of ₹6,00,000 in new equipment, which would have an estimated life of 10 years with no salvage value. Depreciation would be calculated by straight line method.

Except for the costs incurred in advertising ₹ 20,000 per year, no change in the present selling and administrative expenses is expected, if the new product is sold. The details of additional processing costs are as follows:

Variable : ₹ 5 per gallon of waste put into process.

Fixed : (Excluding Depreciation) ₹ 30,000 per year.

There will be no losses in processing, and it is assumed that the total waste processed in a given year will be sold in the same year. Estimates indicate that 50,000 gallons of the product could be sold each year.

The management when confronted with the choice of disposing off the waste or processing it further and selling it, seeks your ADVICE. Which alternative would you recommend? Assume that the firm's cost of capital is 15% and it pays on an average 50% Tax on its income.

You should consider Present value of Annuity of ₹ 1 per year @ 15% p.a. for 10 years as 5.019.

14. Manoranjan Ltd is a News broadcasting channel having its broadcasting Centre in Mumbai. There are total 200 employees in the organisation including top management. As a part of employee benefit expenses, the company serves tea or coffee to its employees, which is outsourced from a third-party. The company offers tea or coffee three times a day to each of its employees. 120 employees prefer tea all three times, 40 employees prefer coffee all three times and remaining prefer tea only once in a day. The third-party charges ₹ 10 for each cup of tea and ₹ 15 for each cup of coffee. The company works for 200 days in a year.

Looking at the substantial amount of expenditure on tea and coffee, the finance department has proposed to the management an installation of a master tea and coffee vending machine which will cost ₹ 10,00,000 with a useful life of five years. Upon purchasing the machine, the company will have to enter into an annual maintenance contract with the vendor, which will require a payment of ₹ 75,000 every year. The machine would require electricity consumption of 500 units p.m. and current incremental cost of electricity for the company is ₹ 12

per unit. Apart from these running costs, the company will have to incur the following consumables expenditure also:

- (1) Packets of Coffee beans at a cost of ₹ 90 per packet.
- (2) Packet of tea powder at a cost of ₹ 70 per packet.
- (3) Sugar at a cost of ₹ 50 per Kg.
- (4) Milk at a cost of ₹ 50 per litre.
- (5) Paper cup at a cost of 20 paise per cup.

Each packet of coffee beans would produce 200 cups of coffee and same goes for tea powder packet. Each cup of tea or coffee would consist of 10g of sugar on an average and 100 ml of milk.

The company anticipate that due to ready availability of tea and coffee through vending machines its employees would end up consuming more tea and coffee. It estimates that the consumption will increase by on an average 20% for all class of employees. Also, the paper cups consumption will be 10% more than the actual cups served due to leakages in them.

The company is in the 25% tax bracket and has a current cost of capital at 12% per annum. Straight line method of depreciation is allowed for the purpose of taxation. You as a financial consultant is required to ADVISE on the feasibility of acquiring the vending machine.

PV factors @ 12%:

Year	1	2	3	4	5
PVF	0.8929	0.7972	0.7118	0.6355	0.5674

Case Scenarios

1. Twigato Ltd is an all equity financed company in the food delivery business and is considering an expansion into quick grocery delivery business segment. It is the market leader in the current food delivery business with a valuation of ₹ 5750 crores. From the discussion in the recent fund-raising meeting with the venture capitalists, it has been noted that the quick delivery business is expected to be run for 6 years, after which it will be sold to another entity for a target valuation of 2 times of the investment made in the business segment. The new segment will be

funded by debt, preference and equity shares in the ratio of 3:2:5. The quick grocery delivery would require ₹ 30 crores of investment to start with and subsequently it will require additional infusion of ₹ 20 crores in start of year 2 and ₹ 25 crores of fund infusion in start of year 4. The operating financials of the business is expected to be on following lines for the 1st year of operation.

No of quick orders = 10,000 per day

No of overnight orders = 2,000 per day

Ticket sizes quick orders: 5,000 orders below ₹ 500, 3,000 orders between ₹ 500 and ₹ 1,000 and 2,000 orders above ₹ 1000 with average ticket size being ₹ 700 per order.

Delivery charges are applicable for orders below ₹ 500, which is flat ₹ 40 per order.

The company would charge 5% of invoice value from the seller of the quick delivery products and 7% in case of overnight delivery.

Overnight deliveries would be available to only subscription-based customers and subscription charges are ₹ 5,000 p.a. Each overnight order is expected to be having an average ticket size of ₹ 750 per order. Each subscription-based customer is expected to place order every alternate day on an average.

The quantity of orders is expected to be growing at a rate of 20%, 15%, 10%, 5% for 1st 4 years of operations. Beyond this it is expected to be remaining constant. The proportion of orders is expected to remain unchanged.

To attract the prospective customers, it is likely to spend heavily on advertising in initial years. The advertising and promotional activities would cost ₹ ₹ 7 crores, ₹ 8 crores and ₹ 10 crores in year 1, 2 and 3 respectively.

Remuneration to delivery partners will be ₹ 15,000 p.m. fixed plus ₹ 20 per delivery. Each delivery partner can deliver an average of 30 orders per day. An additional provision of 50% of extra delivery partners to be made to consider the unexpected spike in orders on special occasions and holidays. The IT infrastructure and customer care expenses would amount to ₹ 8 crores each year.

Income Tax allows 20% p.a. depreciation on straight line basis for any fresh investments. Applicable tax rate can be taken as 25%. The after-tax cost of debt, preference share, and equity share would amount to 10%, 11% and 15% respectively.

Assume 365 days in a year.

- (i) Which of the following is the best estimate of discounting rate for the project?
- (a) 12.00%
 - (b) 11.55%
 - (c) 12.70%
 - (d) 13.75%
- (ii) Which of the following is the best measure of delivery partners required in year 1?
- (a) 600
 - (b) 720
 - (c) 828
 - (d) 911
- (iii) Which of the following is the best measure of total revenue in year 3?
- (a) 30 crores
 - (b) 25.78 crores
 - (c) 33.66 crores
 - (d) 25.91crores
- (iv) Which of the following years best represents the years of loss?
- (a) Year 1 only
 - (b) Year 1 and 2 only
 - (c) Year 1,2 and 3 only
 - (d) Year 1,2,3 and 4 only
- (v) Which of the following in the best measure of NPV of the project?
- (a) 39.35 crores
 - (b) (25.63) crores
 - (c) 23.76 cores
 - (d) (35.67) crores

ANSWERS/SOLUTIONS

Answers to the MCQs

1.	(d)	2.	(a)	3.	(a)	4.	(b)	5.	(c)	6.	(a)
7.	(a)	8.	(b)	9.	(a)	10.	(b)	11.	(c)	12.	(d)
13.	(a)	14.	(a)	15.	(c)						

Answers to Theoretical Questions

1. Please refer paragraph 7
2. Please refer paragraph 9.1
3. Please refer paragraph 3
4. Please refer paragraph 4
5. Please refer paragraph 9.2
6. Please refer paragraph 9.5

Answers to Practical Problems

1. (i) Cost of the Project

At 12% internal rate of return (IRR), the sum of total cash inflows = cost of the project i.e initial cash outlay

Annual cash inflows = ₹ 1,00,000

Useful life = 4 years

Considering the discount factor table @ 12%, cumulative present value of cash inflows for 4 years is 3.038 (0.893 + 0.797 + 0.712 + 0.636).

Hence, Total Cash inflows for 4 years for the Project is:

$$₹ 1,00,000 \times 3.038 = ₹ 3,03,800$$

$$\text{Hence, Cost of the Project} = ₹ 3,03,800$$

(ii) Cost of Capital

$$\text{Profitability index} = \frac{\text{Sum of Discounted Cash inflows}}{\text{Cost of the project}}$$

$$1.064 = \frac{\text{Sum of Discounted Cash inflows}}{\text{₹ 3,03,800}}$$

$$\therefore \text{Sum of Discounted Cash inflows} = \text{₹ 3,23,243.20}$$

$$\text{Since, Annual Cash Inflows} = \text{₹ 1,00,000}$$

$$\text{Hence, cumulative discount factor for 4 years} = \frac{\text{₹ 3,23,243.20}}{\text{₹ 1,00,000}} = 3.232$$

From the discount factor table, at discount rate of 9%, the cumulative discount factor for 4 years is 3.239 (0.917 + 0.842 + 0.772 + 0.708).

Hence, Cost of Capital = 9% (approx.)

(iii) Net Present Value (NPV)

$$\text{NPV} = \text{Sum of Present Values of Cash inflows} - \text{Cost of the Project}$$

$$= \text{₹ 3,23,243.20} - \text{₹ 3,03,800} = \text{₹ 19,443.20}$$

(iv) Payback Period

$$\text{Payback period} = \frac{\text{Cost of the Project}}{\text{Annual Cash Inflows}} = \frac{\text{₹ 3,03,800}}{\text{₹ 1,00,000}} = 3.038 \text{ years}$$

2. Working:**Calculation of Cash -outflow at year zero**

Particulars	A (₹)	B (₹)
Cost of Machine	5,00,000	5,00,000
Cost of Utilities	1,00,000	2,00,000
Salvage value of Old Machine	(1,00,000)	(1,00,000)
Salvage of value Old Utilities	—	(20,000)
Total Expenditure (Net)	5,00,000	5,80,000

(i) (a) Calculation of NPV

Year	PV Factor @ 15%	Machine A		Machine B	
		Cash Inflows (₹)	Discounted value of inflows (₹)	Cash Inflows (₹)	Discounted value of inflows (₹)
0	1.000	(5,00,000)	(5,00,000)	(5,80,000)	(5,80,000)
1	0.870	1,00,000	87,000	2,00,000	1,74,000
2	0.756	1,50,000	1,13,400	2,10,000	1,58,760
3	0.658	1,80,000	1,18,440	1,80,000	1,18,440
4	0.572	2,00,000	1,14,400	1,70,000	97,240
5	0.497	1,70,000	84,490	40,000	19,880
Salvage	0.497	50,000	24,850	60,000	29,820
Net Present Value			42,580		18,140

Since the Net present Value of both the machines is positive both are acceptable.

(b) Discounted Pay-back Period (Amount in ₹)

Year	Machine A		Machine B	
	Discounted cash inflows	Cumulative Discounted cash inflows	Discounted cash inflows	Cumulative Discounted cash inflows
1	87,000	87,000	1,74,000	1,74,000
2	1,13,400	2,00,400	1,58,760	3,32,760
3	1,18,440	3,18,840	1,18,440	4,51,200
4	1,14,400	4,33,240	97,240	5,48,440
5	1,09,340*	5,42,580	49,700*	5,98,140

* Includes salvage value.

Discounted Payback Period (For A and B):

$$\text{Machine A} = 4 \text{ years} + \left(\frac{5,00,000 - 4,33,240}{1,09,340} \right) = 4.61 \text{ years}$$

$$\text{Machine B} = 4 \text{ years} + \left(\frac{5,80,000 - 5,48,440}{49,700} \right) = 4.63 \text{ years}$$

(c) Desirability Factor or Profitability Index:

$$\frac{\text{Profitability Index (PI)}}{\text{Sum of present value of net cash inflow}} = \frac{\text{Initial cash outflow}}{\text{Initial cash outflow}}$$

$$\text{Machine A} = \frac{₹ 5,42,580}{₹ 5,00,000} = 1.08; \quad \text{Machine B} = \frac{₹ 5,98,140}{₹ 5,80,000} =$$

1.03

- (ii) Since the absolute surplus in the case of A is more than B and also the desirability factor, it is better to choose A.

The discounted payback period in both the cases is almost same, also the net present value is positive in both the cases, but the desirability factor (profitability index) is higher in the case of Machine A, it is therefore better to choose Machine A.

3. (a) Computation of NPV at 15% discount rate

Year	Cash flow	Discount Factor (15%)	Present value
	(₹)		(₹)
0	(7,00,000)	1.000	(7,00,000)
1	(10,00,000)	0.870	(8,70,000)
2	2,50,000	0.756	1,89,000
3	3,00,000	0.658	1,97,400
4	3,50,000	0.572	2,00,200
5 – 10	4,00,000	2.163	8,65,200
Net Present Value			(1,18,200)

As the net present value is negative, the project is unacceptable.

(b) Computation of NPV if discount rate would be 10% discount rate

Year	Cash flow	Discount Factor (10%)	Present value
	(₹)		(₹)
0	(7,00,000)	1.000	(7,00,000)

1	(10,00,000)	0.909	(9,09,000)
2	2,50,000	0.826	2,06,500
3	3,00,000	0.751	2,25,300
4	3,50,000	0.683	2,39,050
5 – 10	4,00,000	2.974	11,89,600
Net Present Value			2,51,450

Since NPV = ₹ 2,51,450 is positive, hence the project would be acceptable.

(c) Calculation of IRR:

$$\begin{aligned}
 \text{IRR} &= \text{LR} + \frac{\text{NPV at LR}}{\text{NPV at LR} - \text{NPV at HR}} \times (\text{HR} - \text{LR}) \\
 &= 10\% + \frac{₹ 2,51,450}{₹ 2,51,450 - (-) 1,18,200} \times (15\% - 10\%) \\
 &= 10\% + 3.4012 \text{ or } 13.40\%
 \end{aligned}$$

(d) Computation of Pay-back period of the project:

Payback Period = 6 years:

$$\begin{aligned}
 &- ₹ 7,00,000 - ₹ 10,00,000 + ₹ 2,50,000 + ₹ 3,00,000 + ₹ 3,50,000 + \\
 &₹ 4,00,000 + ₹ 4,00,000 = 0
 \end{aligned}$$

4. Calculation of NPV

Project	Investment Required	Present value of Future Cash Flows	Net Present value
	₹	₹	₹
1	2,00,000	2,90,000	90,000
2	1,15,000	1,85,000	70,000
3	2,70,000	4,00,000	1,30,000
1 and 2	3,15,000	4,75,000	1,60,000
1 and 3	4,40,000	6,90,000	2,50,000
2 and 3	3,85,000	6,20,000	2,35,000
1, 2 and 3 (Refer Working note)	6,80,000*	9,10,000	2,30,000

Working Note:

- (i) Total Investment required if all the three projects are undertaken simultaneously:

	(₹)
Project 1 & 3	4,40,000
Project 2	1,15,000
Plant extension cost	1,25,000
Total	6,80,000

- (ii) Total of Present value of Cash flows if all the three projects are undertaken simultaneously:

	(₹)
Project 2 & 3	6,20,000
Project 1	2,90,000
Total	9,10,000

Projects 1 and 3 should be chosen, as they provide the highest net present value.

5. Calculation of Net Cash flow

$$\text{Contribution} = (3.00 - 1.75) \times 50,000 = ₹ 62,500$$

$$\text{Fixed costs} = 40,000 - [(1,25,000 - 30,000)/5] = ₹ 21,000$$

Year	Capital (₹)	Contribution (₹)	Fixed costs (₹)	Adverts (₹)	Net cash flow (₹)
0	(1,00,000)	-	-	-	(1,00,000)
1	(25,000)	62,500	(21,000)	(10,000)	6,500
2	-	62,500	(21,000)	(15,000)	26,500
3	-	62,500	(21,000)	-	41,500
4	-	62,500	(21,000)	-	41,500
5	30,000	62,500	(21,000)	-	71,500

Calculation of Net Present Value

Year	Net cash flow (₹)	10% discount factor	Present value (₹)
0	(1,00,000)	1.000	(1,00,000)
1	6,500	0.909	5,909
2	26,500	0.826	21,889
3	41,500	0.751	31,167
4	41,500	0.683	28,345
5	71,500	0.621	44,402
NPV			31,712

The net present value of the project is ₹ 31,712.

6. Statement Showing the Evaluation of Two Machines

	Particulars	Machine 'X'	Machine 'Y'
(i)	Purchase Cost	₹ 15,00,000	₹ 10,00,000
(ii)	Life of Machine	3 years	2 years
(iii)	Running Cost of Machine per year	₹ 4,00,000	₹ 6,00,000
(iv)	PVIFA (0.09, 3)	2.531	
	PVIFA (0.09, 2)		1.759
(v)	PV of Running Cost of Machine {(iii) × (iv)}	₹ 10,12,400	₹ 10,55,400
(vi)	Cash outflows of Machine {(i) + (v)}	₹ 25,12,400	₹ 20,55,400
(vii)	Equivalent PV of Annual Cash outflow {(vi)/(iv)}	₹ 9,92,651	₹ 11,68,505

Recommendation: Ae Bee Cee Ltd. should buy Machine 'X' since equivalent annual cash outflow is less than that of Machine 'Y'.

7. Option I: Purchase Machinery and Service Part at the end of Year 1.

Net Present value of cash flow @ 10% per annum discount rate.

$$\text{NPV (in ₹)} = -1,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} - \frac{20,000}{(1.1)} + \frac{25,000}{(1.1)^3}$$

$$= -1,00,000 + 36,000 (0.9091 + 0.8264 + 0.7513) - (20,000 \times 0.9091) + (25,000 \times 0.7513)$$

$$= -1,00,000 + (36,000 \times 2.4868) - 18,182 + 18,782.5$$

$$= -1,00,000 + 89,524.8 - 18,182 + 18,782.5$$

$$\text{NPV} = -9,874.7$$

Since, Net Present Value is negative; therefore, this option is not to be considered.

If Supplier gives a discount of ₹ 10,000, then:

$$\text{NPV (in ₹)} = +10,000 - 9,874.7 = +125.3$$

In this case, Net Present Value is positive but very small; therefore, this option may not be advisable.

Option II: Purchase Machinery and Replace Part at the end of Year 2.

$$\text{NPV (in ₹)} = -1,00,000 + \frac{36,000}{(1.1)} + \frac{36,000}{(1.1)^2} + \frac{36,000}{(1.1)^3} - \frac{30,800}{(1.1)^2} + \frac{54,000}{(1.1)^4}$$

$$= -1,00,000 + 36,000 (0.9091 + 0.8264 + 0.7513) - (30,800 \times 0.8264) + (54,000 \times 0.6830)$$

$$= -1,00,000 + 36,000 (2.4868) - 25,453.12 + 36,882$$

$$= -1,00,000 + 89,524.8 - 25,453.12 + 36,882$$

$$\text{NPV} = +953.68$$

Net Present Value is positive, but very low as compared to the investment.

If the Supplier gives a discount of ₹ 10,000, then:

$$\text{NPV (in ₹)} = 10,000 + 953.68 = 10,953.68$$

Decision: Option II is worth investing as the net present value is positive and higher as compared to Option I.

8. Determination of Cash inflows

Particulars	(₹)
Sales Revenue	1,20,000
Less: Operating Cost	22,500
	97,500
Less: Depreciation (₹ 2,00,000 – ₹ 18,000)/8	22,750
Net Income	74,750
Less: Tax @ 30%	22,425
Earnings after Tax (EAT)	52,325
Add: Depreciation	22,750
Cash inflow after tax per annum	75,075
Less: Loss of Commission Income	36,000
Net Cash inflow after tax per annum	39,075
In 8 th Year :	
New Cash inflow after tax	39,075
Add: Salvage Value of Machine	18,000
Net Cash inflow in year 8	57,075

(i) Calculation of Net Present Value (NPV)

Year	CFAT (₹)	PV Factor @10%	Present Value of Cash inflows (₹)
1 to 7	39,075	4.867	1,90,178.03
8	57,075	0.467	26,654.03
			2,16,832.06
		Less: Cash Outflows	2,00,000.00
		NPV	16,832.06

(ii) Calculation of Profitability Index

$$\text{Profitability Index} = \frac{\text{Sum of discounted cash in flows}}{\text{Present value of cash out flows}} = \frac{2,16,832.06}{2,00,000} = 1.084$$

Advise: Since the net present value (NPV) is positive and profitability index is also greater than 1, the hospital may purchase the machine.

9. Workings:

(a) Calculation of annual cash flows (₹ in lakh)

Year	Sales	VC	FC	Dep.	Profit	Tax	PAT	Dep.	Cash inflow
1	172.80	103.68	36	43.75	(10.63)	—	—	43.75	33.12
2	259.20	155.52	36	43.75	23.93	3.99*	19.94	43.75	63.69
3	624.00	374.40	36	43.75	169.85	50.955	118.895	43.75	162.645
4–5	648.00	388.80	36	48.25	174.95	52.485	122.465	48.25	170.715
6–8	432.00	259.20	36	48.25	88.55	26.565	61.985	48.25	110.235

(b) Calculation of Depreciation:

- On Initial equipment = $\frac{\text{₹ 350 lakh}}{8 \text{ years}}$ = 43.75 lakh
- On additional equipment = $\frac{(\text{₹ 25} - \text{₹ 2.5}) \text{ lakh}}{5 \text{ years}}$ = 4.5 lakh

(c) *Calculation of tax in 2nd Year:

	₹ in lakh
Profit for the year	23.93
Less: Set off of unabsorbed depreciation in 1 st year	(10.63)
Taxable profit	13.30
Tax @30%	3.99

(d) Calculation of Initial cash outflow

	₹ in lakh
Cost of New Equipment	350
Add: Working Capital	40
Outflow	390

Calculation of NPV (₹ in lakh)

Year	Cash flows	PV factor @12%	PV of cash-flows	Remark
0	(390)	1.000	(390.00)	Initial equipment cost

1	33.12	0.893	29.57	
2	63.69	0.797	50.76	
3	162.645	0.712	115.80	
3	(25.00)	0.712	(17.80)	Additional equipment cost
4	170.715	0.636	108.57	
5	170.715	0.567	96.79	
6	110.235	0.507	55.89	
7	110.235	0.452	49.83	
8	110.235	0.404	44.53	
8	40.00	0.404	16.16	Release of working capital
8	2.50	0.404	1.01	Additional equipment salvage value
Net Present Value			161.11	

Advise: Since the project has a positive NPV, therefore, it should be accepted.

10. Statement of Operating Profit from processing of waste

(₹ in lakh)

Year	1	2	3	4
Sales (A)	966	966	1,254	1,254
Material consumption	90	120	255	255
Wages	180	195	255	300
Other expenses	120	135	162	210
Factory overheads (insurance only)	90	90	90	90
Depreciation (as per income tax rules)	150	114	84	63
Total cost (B)	630	654	846	918
Profit {(C)=(A) - (B)}	336	312	408	336
Less: Tax (30%)	100.8	93.6	122.4	100.8
Profit after Tax (PAT)	235.2	218.4	285.6	235.2
Less: Loss of rent on storage space (opportunity cost)	30	30	30	30
PAT after opportunity cost	205.2	188.4	255.6	205.2

Statement of Incremental Cash Flows**(₹ in lakh)**

Year	0	1	2	3	4
Cost of Machine	(600)				
Material stock	(60)	(105)	-	-	165
Compensation for contract	(90)	-	-	-	-
Contract payment saved	-	150	150	150	150
Tax on contract payment	-	(45)	(45)	(45)	(45)
Incremental profit	-	336	312	408	336
Depreciation added back	-	150	114	84	63
Tax on profits	-	(100.8)	(93.6)	(122.4)	(100.8)
Profit on sale of machinery (net)	-	-	-	-	15
Total incremental cash flows	(750)	385.2	437.4	474.6	583.2
Present value factor	1	0.877	0.769	0.674	0.592
Present value of cash flows	(750)	337.82	336.36	319.88	345.25
Net present value	589.32				

Advice: Since the net present value of cash flows is ₹ 589.32 lakh which is positive the management should install the machine for processing the waste.

Notes:

1. Material stock increases are taken in cash flows.
2. Idle time wages have also been considered.
3. Apportioned factory overheads are not relevant only insurance charges of this project are relevant.
4. Sale of machinery - Net income after deducting removal expenses taken. Tax on Capital gains is ignored.
5. Saving in contract payment and income tax thereon is considered in the cash flows.

11. (i) Calculation of Net Initial Cash Outflows:

	₹
Cost of new machine	10,00,000
Less: Sale proceeds of existing machine	2,00,000
Net initial cash outflows	8,00,000

(ii) Calculation of Base for depreciation

Particulars	₹
WDV of Existing Machine	
Cost of existing machine	3,30,000
Less: Depreciation for year 1	66,000
Depreciation for Year 2	52,800
Depreciation for Year 3	<u>42,240</u>
WDV of Existing Machine (i)	1,68,960
Depreciation base of New Machine	
Cost of new machine	10,00,000
Add: WDV of existing machine	1,68,960
Less: Sales value of existing machine	2,00,000
Depreciation base of New Machine (ii)	9,68,960
Base for incremental depreciation [(ii) – (i)]	8,00,000

(iii) Calculation of annual Profit Before Tax and depreciation

Particulars	Existing machine	New Machine	Differential
(1)	(2)	(3)	(4) = (3) – (2)
Annual output	30,000 units	75,000 units	45,000 units
	₹	₹	₹
(A) Sales revenue @ ₹ 15 per unit	4,50,000	11,25,000	6,75,000
(B) Less: Cost of Operation			
Material @ ₹ 4 per unit	1,20,000	3,00,000	1,80,000

Labour			
Old = $3,000 \times ₹ 40$	1,20,000		90,000
New = $3,000 \times ₹ 70$		2,10,000	
Indirect cash cost	50,000	65,000	15,000
Total Cost (B)	2,90,000	5,75,000	2,85,000
Profit Before Tax and depreciation (PBT) (A – B)	1,60,000	5,50,000	3,90,000

(iv) Calculation of Incremental Net Present Value:

Year	PBTD	Dep. @ 20%	PBT	Tax @ 30%	Net cash flow	PVF @ 12%	PV
(1)	(2)	(3)	(4=2-3)	(5)	(6=4-5+3)	(7)	(8=6 x 7)
1	3,90,000	1,60,000	2,30,000	69,000.00	3,21,000.00	0.893	2,86,653.00
2	3,90,000	1,28,000	2,62,000	78,600.00	3,11,400.00	0.797	2,48,185.80
3	3,90,000	1,02,400	2,87,600	86,280.00	3,03,720.00	0.712	2,16,248.64
4	3,90,000	81,920	3,08,080	92,424.00	2,97,576.00	0.636	1,89,258.34
5	3,90,000	65,536	3,24,464	97,339.20	2,92,660.80	0.567	1,65,938.67
							11,06,284.45
Add: PV of Salvage Value of new machine ($₹ 40,000 \times 0.567$)							22,680.00
Less: Initial Cash Outflow							8,00,000.00
NPV							3,28,964.45

Advice: Since the incremental NPV is positive, existing machine should be replaced.

12.

A & Co.**Equivalent cost of (EAC) of new machine**

		₹
(i)	Cost of new machine now	90,000
	Add: PV of annual repairs @ ₹ 10,000 per annum for 8 years ($₹ 10,000 \times 4.4873$)	<u>44,873</u>
		1,34,873
	Less: PV of salvage value at the end of 8 years ($₹ 20,000 \times 0.3269$)	<u>6,538</u>
		<u>1,28,335</u>
	Equivalent annual cost (EAC) ($₹ 1,28,335 / 4.4873$)	<u>28,600</u>

**PV of cost of replacing the old machine in each of 4 years
with new machine**

Scenario	Year	Cash Flow	PV @ 15%	PV
		(₹)		(₹)
Replace Immediately	0	(28,600)	1.00	(28,600)
		40,000	1.00	<u>40,000</u>
				<u>11,400</u>
Replace in one year	1	(28,600)	0.870	(24,882)
	1	(10,000)	0.870	(8,700)
	1	25,000	0.870	<u>21,750</u>
				<u>(11,832)</u>
Replace in two years	1	(10,000)	0.870	(8,700)
	2	(28,600)	0.756	(21,622)
	2	(20,000)	0.756	(15,120)
	2	15,000	0.756	<u>11,340</u>
				<u>(34,102)</u>
Replace in three years	1	(10,000)	0.870	(8,700)
	2	(20,000)	0.756	(15,120)
	3	(28,600)	0.658	(18,819)
	3	(30,000)	0.658	(19,740)
	3	10,000	0.658	<u>6,580</u>
				<u>(55,799)</u>
Replace in four years	1	(10,000)	0.870	(8,700)
	2	(20,000)	0.756	(15,120)
	3	(30,000)	0.658	(19,740)
	4	(28,600)	0.572	(16,359)
	4	(40,000)	0.572	<u>(22,880)</u>
				<u>(82,799)</u>

Advice: The company should replace the old machine immediately because the PV of cost of replacing the old machine with new machine is least.

13. Evaluation of Alternatives:**Savings in disposing off the waste**

Particulars	(₹)
Outflow (50,000 × ₹ 1)	50,000
Less: tax savings @ 50%	25,000
Net Outflow per year	25,000

Calculation of Annual Cash inflows in Processing of waste Material

Particulars	Amount (₹)	Amount (₹)
Sale value of waste (₹ 10 × 50,000 gallon)		5,00,000
Less: Variable processing cost (₹ 5 × 50,000 gallon)	2,50,000	
Less: Fixed processing cost	30,000	
Less: Advertisement cost	20,000	
Less: Depreciation	60,000	(3,60,000)
Earnings before tax (EBT)		1,40,000
Less: Tax @ 50%		(70,000)
Earnings after tax (EAT)		70,000
Add: Depreciation		60,000
Annual Cash inflows		1,30,000

Total Annual Benefits = Annual Cash inflows + Net savings (adjusting tax) in disposal cost

$$= ₹ 1,30,000 + ₹ 25,000 = ₹ 1,55,000$$

Calculation of Net Present Value

Year	Particulars	Amount (₹)
0	Investment in new equipment	(6,00,000)
1 to 10	Total Annual benefits × PVAF (10 years, 15%)	

₹ 1,55,000 × 5.019	7,77,945
Net Present Value	1,77,945

Recommendation: Processing of waste is a better option as it gives a positive Net Present Value.

Note- Research cost of ₹ 60,000 is not relevant for decision making as it is sunk cost.

14. A. Computation of CFAT (Year 1 to 5)

Particulars	Amount (₹)
(a) Savings in existing Tea & Coffee charges $(120 \times 10 \times 3) + (40 \times 15 \times 3) + (40 \times 10 \times 1) \times 200$ days	11,60,000
(b) AMC of machine	(75,000)
(c) Electricity charges $500 \times 12 \times 12$	(72,000)
(d) Coffee Beans (W.N.) 144×90	(12,960)
(e) Tea Powder (W.N.) 480×70	(33,600)
(f) Sugar (W.N.) 1248×50	(62,400)
(g) Milk (W.N.) 12480×50	(6,24,000)
(h) Paper Cup (W.N.) $1,37,280 \times 0.2$	(27,456)
(i) Depreciation $10,00,000/5$	(2,00,000)
Profit before Tax	52,584
(-) Tax @ 25%	(13,146)
Profit after Tax	39,438
Depreciation	2,00,000
CFAT	2,39,438

B. Computation of NPV

Year	Particulars	CF	PVF @ 12%	PV
0	Cost of machine	(10,00,00)	1	(10,00,000)
1-5	CFAT	2,39,438	3.6048	8,63,126
Net Present Value				(1,36,874)

Since NPV of the machine is negative, it should not be purchased.

Working Note:

Computation of Qty of consumable

$$\text{No. of Tea Cups} = [(120 \times 3 \times 200 \text{ days}) + (40 \times 1 \times 200 \text{ days}) \times 1.2 = 96,000$$

$$\text{No. of Coffee cups} = 40 \times 3 \times 200 \text{ days} \times 1.2 = 28,800$$

$$\text{No. of coffee beans packet} = \frac{28,800}{200} = 144$$

$$\text{No. of Tea Powder Packets} = \frac{96,000}{200} = 480$$

$$\text{Qty of Sugar} = \frac{(96,000 + 28,800)6,000}{1,000 \text{ g}} = 1248 \text{ kgs}$$

$$\text{Qty of Milk} = \frac{(96,000 + 28,800)6,000}{1,000 \text{ ml}} = 12,480 \text{ litres}$$

$$\text{No. of paper cups} = (96,000 + 28,800) \times 1.1 = 1,37,280$$

Answers to the Case Scenarios

i. (c) ii. (a) iii. (c) iv. (d) v. (a)

1 (i) Calculation of cost of capital

Capital	Weight	Cost	Product
Debt	0.3	10%	3.00%
Preference	0.2	11%	2.20%
Equity	0.5	15%	7.50%
	Ko		12.70%

Calculation of CFAT

Year	1	2	3	4	5	6
A) No. of quick deliveries p.d.	10,000	12,000	13,800	15,180	15,939	15,939
B) No. of overnight deliveries p.d.	2,000	2,400	2,760	3,036	3,188	3,188
C) No. of quick deliveries p.a.	36,50,000	43,80,000	50,37,000	55,40,700	58,17,735	58,17,735
D) No. of overnight deliveries p.a.	7,30,000	8,76,000	10,07,400	11,08,140	11,63,547	11,63,547
E) Chargeable quick deliveries	18,25,000	21,90,000	25,18,500	27,70,350	29,08,868	29,08,868
F) No. of delivery partners	600	720	828	911	956	956
	$1.5 \times (A + B) / 30$					
Revenue (₹ in crores)						
From quick deliveries (QD)	7.30	8.76	10.07	11.08	11.64	11.64
From QD seller commission	12.775	15.330	17.630	19.392	20.362	20.362
From Overnight delivery subscription	0.500	0.600	0.690	0.759	0.797	0.797
From OD seller commission	3.83	4.60	5.29	5.82	6.11	6.11
Total Revenue	24.41	29.29	33.68	37.05	38.90	38.90
Cost (in crores)						
Advertising	7	8	10	0	0	0

IT and customer care		8	8	8	8	8	8
Delivery partner salary	(F x 15000)	0.90	1.08	1.24	1.37	1.43	1.43
Delivery partner commission	(C+D) x 20	8.76	10.51	12.09	13.30	13.96	13.96
Depreciation	on investment in year 0	6	6	6	6	6	
	on investment in year 2		4	4	4	4	4
	on investment in year 4				5	5	5
Total Cost		30.66	37.59	41.33	37.66	38.40	32.40
PBT		(6.25)	(8.30)	(7.65)	(0.61)	0.51	6.51
Less: Tax		1.56	2.08	1.91	0.15	(0.13)	(1.63)
PAT		(4.69)	(6.23)	(5.74)	(0.46)	0.38	4.88
Add: Depreciation		6.00	10.00	10.00	15.00	15.00	9.00
CFAT		1.31	3.77	4.26	14.54	15.38	13.88

Computation of NPV

Year	Particulars		Cash Flows (₹ in crores)	PVF @ 12.7%	PV (₹ in crores)
0	Investment		(30.00)	1.00	(30.00)
1	Investment		(20.00)	0.89	(17.75)
3	Investment		(25.00)	0.70	(17.46)
1	Operating CFAT		1.31	0.887	1.16
2	Operating CFAT		3.77	0.787	2.97
3	Operating CFAT		4.26	0.699	2.98
4	Operating CFAT		14.54	0.620	9.01
5	Operating CFAT		15.38	0.550	8.46
6	Operating CFAT		13.88	0.488	6.77
6	Sale Proceeds	$(30+20+25) \times 2$	150	0.488	73.21
	NPV				39.35

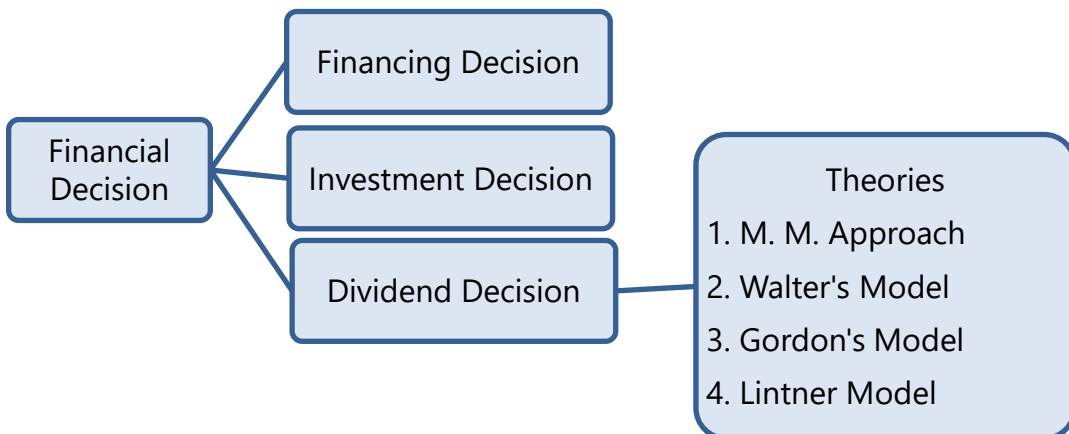
DIVIDEND DECISIONS



LEARNING OUTCOMES

- ◆ Understand the Meaning of Dividend Decision.
- ◆ Understand the importance of Dividend Decision.
- ◆ Discuss various forms of Dividend.
- ◆ Discuss various Determinants of Dividend.
- ◆ Explain various theories of Dividend Decisions.

CHAPTER OVERVIEW





1. INTRODUCTION

As we had already discussed in Chapter 1 (Scope and Objectives of Financial Management), Financial Management is the process of making financial decisions so as to increase the value of the firm.

Long term Finance function decisions broadly covers three areas:

- i. Financing decision
- ii. Investment decision
- iii. Dividend decision

So far, we had already discussed the first two decisions that are Financing and Investment decisions in earlier chapters. In this chapter, we will discuss the "Dividend decision" which is one of the **most important areas of management decisions**.

Dividend Decision is easy to understand but difficult to implement. Let us understand this with the help of an example, suppose a company, say X limited, which is continuously paying the dividend at a normal growth rate, earns huge profits this year. Now the management have to decide whether it should continue to pay dividend at normal rate or to pay at an increasing rate. Why this dilemma? The reason is that, if the management decides to pay higher dividend, then it might be possible that next year, the company will not achieve such higher growth rate, resulting in lower dividend payment in comparison to previous year. However, if the company decides to stay on the normal rate of dividend, then surplus amount of retained earnings would remain idle which will result in over capitalization, if no other opportunity exist to utilize the idle funds.

Further, there are some other factors also which will affect the dividend decision (will be discussed later).

Furthermore, there are few Dividend theories which put light on the complexities involved in dividend decision. These theories have been discussed under the following two categories:

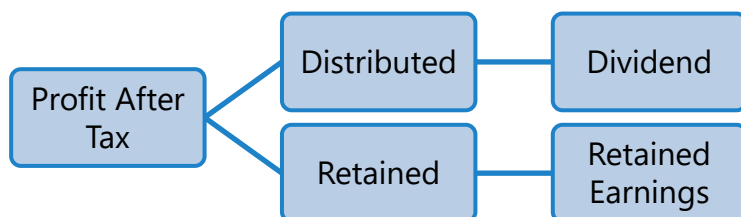
Irrelevance Theory: MM Approach

Relevance Theory: Walter's Model, Gordon's Model and Lintner Model

2. MEANING OF DIVIDEND

Dividend is that part of Profit After Tax (PAT) which is **distributed to the shareholders** of the company. Further, the profit earned by a company after paying taxes can be used for:

- i. Distribution of dividend, or
- ii. Retaining as surplus for future growth



One of the important term to understand with regard to dividend is ex-dividend. Ex-dividend refers to shares that no longer carry the right to dividend. Price at which shares trades immediately on next day after declaration of dividend is referred to as Ex-dividend price.

3. FORMS OF DIVIDEND

Generally, the dividend can be of the following forms (depending upon some factors that will be discussed later):

1. **Cash dividend:** It is the most **common form of dividend**. Cash here means cash, cheque, warrant, demand draft, pay order or directly through Electronic Clearing Service (ECS) but not in kind.
2. **Share repurchases:** A share repurchase is transaction in which company buys back its own shares using corporate cash. This is done by lot of corporates these days.

The bought back shares as above can be classified as

- a. treasury shares which are kept for re-issuance in future or
- b. cancelled shares if they would be retired from issued share capital.

Share repurchases are also viewed as one form dividend distribution

Keeping other things same (such as tax considerations etc), the effect of cash dividend and share repurchases on shareholder's wealth is same.

Following example explains the same:

Suppose HM Ltd has 1 cr of equity shares outstanding and proposes to pay a dividend of ₹ 50 per share totalling ₹ 50 crores of dividend distribution.

Market price of one share is ₹ 200 on the date of declaration of dividend.

As an alternative if company wishes to repurchase ₹ 50 cr equivalent shares then company would be able to purchase 25 lakhs worth of shares.

The impact on shareholder's wealth who holds 10 shares is explained as follows:

Option 1: In case company pays cash dividend

Ex-dividend price would be ₹ 150 (₹ 200 - ₹ 50), shareholder holding 10 shares would be left with ₹ 2000 worth of wealth after dividend is declared in form of cash as ₹ 500 (₹ 50 dividend on 10 shares) and shares worth ₹ 1500 (₹ 150 share for 10 shares).

Option 2: In case share repurchase is done, then in that case 25% (25 lakhs on 1 crore) of the shares would be purchased i.e. 4 shares and amount paid out would be ₹ 800. After share repurchase the revised market price would be ₹ 200 only explained as follows:

Market capitalisation before share repurchase	₹ 200 cr
Less shares repurchased	₹ 50 cr
Market capitalisation after shares repurchased	₹ 150 cr
No of shares left after repurchase	75 lakhs shares
Market price after shares repurchase	₹ 200 per share.

Hence immediately after repurchase exercise done by company investor's wealth would be ₹ 2000 represented by ₹ 800 on account of cash received on shares repurchased and ₹ 1200 on account of market price of 6 shares left after repurchase.

3. Stock dividend (Bonus Shares): It is a **distribution of shares in lieu of cash dividend**. When the company issues new shares to its existing shareholders without any consideration it is called bonus shares. Such shares are distributed proportionately thereby retaining proportionate ownership of the company. If a

shareholder owns 100 shares at a time and 10% dividend is declared, then he will have 10 ($100 \times 10\%$) additional shares thereby increasing the equity share capital and reducing reserves and surplus (retained earnings). The total net worth is not affected by bonus issue as retained earnings are only capitalised.

Conditions of Stock Dividend or Bonus Issue

To issue Bonus shares, a Company needs to fulfil all the conditions given by Security Exchange Board of India (SEBI). As per SEBI, the bonus shares are issued not in lieu of cash dividends. A bonus issue should be authorised by Article of Association (AOA) and not to be declared unless all partly paid-up shares have been converted into fully paid-up shares. The Company should not have defaulted in re-payment of loan, interest and any statutory dues. Bonus shares are to be issued only from share premium and free reserves and not from capital reserve on account of fixed assets revaluation.

Bonus shares are used by companies to prevent investors from selling its shares as short term capital gains is 15% and long term capital gains is 10% and the period of holding for bonus shares starts from date of issue of bonus shares. In such a scenario an investor would not immediately sale bonus shares as they might lose 5% on account of taxation.

This generally helps companies indirectly as their prices would not fall further due selling activity from investor's end.

Advantages of Stock Dividend

There are many advantages both to the shareholders and company. Some of the main advantages are listed as under:

(1) To Shareholders:

- (a) No tax is payable by shareholders on stock dividend received from domestic company as it is not treated as dividend but capital asset under Income Tax Act, 1961.
- (b) Policy of paying fixed dividend per share and its continuation even after declaration of stock dividend will increase total cash dividend of the shareholders in future.
- (c) Bonus shares improves liquidity in the hands of shareholders as bonus shares leads to breaking down of higher priced shares into lower priced

shares and hence give a choice to shareholders to sell some of the lower priced shares and get some liquidity.

(2) To Company:

- (a) Conservation of cash for meeting profitable investment opportunities.
- (b) Suitable in case of cash deficiency and restrictions imposed by lenders to pay cash dividend.

Limitations of Stock Dividend

Limitations of stock dividend to shareholders and company are as follows:

1. **To Shareholders:** Stock dividend does not affect the wealth of shareholders and therefore it has no value for them. This is because the declaration of stock dividend is a method of capitalising the past earnings of the shareholders and is a formal way of recognising earnings which the shareholders already own. It merely divides the company's ownership into a large number of share certificates. James Porterfield regards stock dividends as a division of corporate pie into a larger number of pieces. Stock dividend does not give any extra or special benefit to the shareholder. His proportionate ownership in the company does not change at all. Stock dividend creates a favourable psychological impact on the shareholders and is greeted by them on the ground that it gives an indication of the company's growth.
2. **To Company:** Stock dividends are costlier to administer than cash dividends. It is disadvantageous if periodic small stock dividends are declared by the company as earnings.



4. SIGNIFICANCE OF DIVIDEND POLICY

Dividend policy of a firm is governed by:

(i) Long Term Financing Decision:

As we know that one of the financing options is 'Equity'. Equity can either be raised externally through issue of new equity shares or can be generated internally through retained earnings. For Equity, retained earnings are preferable because they do not involve any floatation costs (issue expenses).

But whether to retain or distribute the profits, forms the basis of this decision. Further, payment of cash dividend reduces the amount of funds required to

finance profitable investment opportunities thereby restricting its financing options.

In this backdrop, the decision is based on the following:

1. Whether the organization has opportunities in hand to invest the profit, if retained?
2. Whether the return on such investment (ROI) will be higher than the expectations of shareholders i.e. K_e ?

(ii) Wealth Maximization Decision:

Under this decision, we are facing the problem as to what amount of dividend shall be distributed i.e. the Dividend Payout ratio (D/P) in relation to Market price of the shares (MPS)? This decision is based on the following:

1. Because of market imperfections and uncertainty, shareholders give more importance to near dividends than future dividends and capital gains. Payment of dividends influences the market price of the share directly. Higher dividends increase the value of shares and low dividends decrease it. A proper balance has to be struck between these two approaches.
2. When the firm increases its retained earnings, shareholders' dividends decreases and consequently market price is affected. Use of retained earnings to finance profitable investments increases the future earnings per share. This is because, shareholders expect that profitable investments made by the company may lead to higher return for them in future. On the other hand, increase in dividends may cause the firm to forego investment opportunities for lack of funds and thereby decrease the future earnings per share.

Thus, management should develop a dividend policy **which divides net earnings into dividends and retained earnings** in an optimum way so as to achieve the objective of wealth maximization for shareholders. Such a policy will be influenced by investment opportunities available to the firm and value of dividends as against capital gains to shareholders.



5. RELATIONSHIP BETWEEN RETAINED EARNINGS AND GROWTH

It can be illustrated with the help of the following equation:

$$\text{Growth (g)} = br$$

Where,

g = Growth rate of the firm

b = Retention ratio

r = Rate of return on investment

Let us understand this relationship between retained earnings and growth with the help of following example:

Example – 1

Suppose there are two companies namely A Ltd. & B Ltd. having capital employed of ₹ 50,00,000 in terms of Equity shares (₹ 100 each are earning @ 20%. Both have same capital structure and same ROI but different dividend policy.

A Ltd. distributes 100% of its earnings whereas B Ltd. distributes only 50%.

Now, considering the other things to remain same, the position of both the companies during the next year will be:

A Ltd	(₹)	B Ltd	(₹)
Previous year		Previous year	
Earnings @ 20%	₹ 10,00,000	Earnings @ 20%	₹ 10,00,000
Dividend	₹ 10,00,000	Dividend	₹ 5,00,000
Retained Earnings	Nil	Retained Earnings	₹ 5,00,000
Current year		Current year	
Existing capital	₹ 50,00,000	Existing capital	₹ 50,00,000
Existing Retained Earnings	Nil	Existing Retained Earnings	₹ 5,00,000
Total capital employed	₹ 50,00,000	Total capital employed	₹ 55,00,000
Earnings @ 20%	₹ 10,00,000	Earnings @ 20%	₹ 11,00,000

Hence with the help of above example, it is easy to understand that how retained earnings lead to growth.



6. DETERMINANTS OF DIVIDEND DECISIONS

The dividend policy is affected by the following factors:

1. **Availability of funds:** If the business is in requirement of funds, then retained earnings could be a good source. The reason being the saving of floatation cost and prevention of dilution of control which happens in case of new issue of equity shares to public.
2. **Cost of capital:** If the financing requirements are to be executed through debt (relatively cheaper source of finance), then it would be preferable to distribute more dividend. On the other hand, if the financing is to be done through fresh issue of equity shares, then it is better to use retained earnings as much as possible.
3. **Capital structure:** An optimum Debt Equity ratio should also be considered for the dividend decision.
4. **Stock price:** Stock price here means market price of the shares. Generally, higher dividends increase market value of shares and low dividends decrease the value.
5. **Investment opportunities in hand:** The dividend decision is also affected if there are investment opportunities in hand. In that situation, the company may prefer to retain more earnings.
6. **Trend of industry:** The investors depend on some industries for their regular dividend income. Therefore, in such cases, the firms have to pay dividend in order to survive in the market.
7. **Expectation of shareholders:** The shareholders can be categorised into two categories: (i) those who invests for regular income, & (ii) those who invests for growth. Generally, the investor prefers current dividend over the future growth.
8. **Legal constraints:** Section 123 of the Companies Act, 2013 which provides for declaration of dividend states that Dividend shall be declared or paid by a company for any financial year only:
 - (a) out of the profits of the company for that year arrived at after providing for depreciation in accordance with the relevant provisions , or

- (b) out of the profits of the company for any previous financial year or years arrived at after providing for depreciation in accordance with the relevant provisions and remaining undistributed, or
- (c) out of both, or
- (d) out of money provided by the Central Government or a State Government for the payment of dividend by the company in pursuance of a guarantee given by that Government.

It may be noted that, while computing the profits for payment of dividends any amount representing unrealised gains, notional gains or revaluation of assets and any change in carrying amount of an asset or of a liability on measurement of the asset or the liability at fair value shall be excluded.

9. **Taxation:** Before 1st April 2020, as per Section 115-O of Income Tax Act, 1961, dividend was subject to dividend distribution tax (DDT) in the hands of the company. Dividend on which DDT was paid, was to be exempted in the hands of the shareholder u/s 10(34). However, as per amendment made by the Finance Act 2020, the exemption u/s 10(34) shall not apply to dividend received on or after 1st April 2020 and the dividend income from shares held as investment shall be taxable under the head of 'Other income' at the applicable slab rate. In nutshell dividend would be taxable in the hands of investor.



7. PRACTICAL CONSIDERATIONS IN DIVIDEND POLICY

A discussion on internal financing ultimately turns to practical considerations which determine the dividend policy of a company. The formulation of dividend policy depends upon answers to the following questions:

- Whether there should be a stable pattern of dividends over the years? or
- Whether the company should treat each dividend decision completely independent?

The practical considerations in dividend policy of a company are briefly discussed below:

- (a) **Financial Needs of a Company:** Retained earnings can be a source of finance for creating profitable investment opportunities. As we discussed earlier, when rate

of return of a company is greater than return required by shareholders, it would be advantageous for the shareholders to re-invest their earnings.

Risk and financial obligations increase if a company raises capital through issue of new shares where floatation costs are involved.

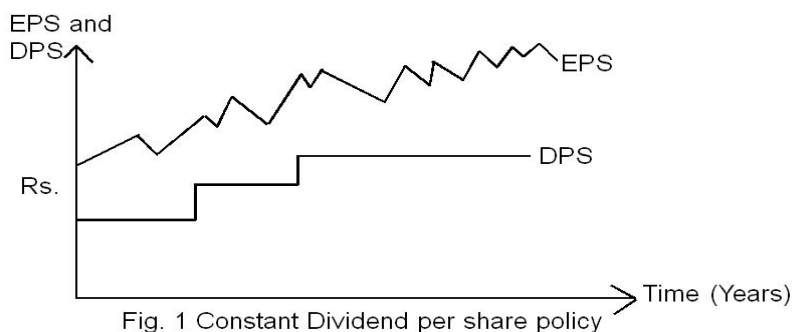
In this respect, a comparison between growth companies and mature companies has been given as follows:

Mature Companies	Growth Companies
1. Mature companies having few investment opportunities will show high payout ratios;	1. Growth companies have low payout ratios. They are in need of funds to finance fast growing fixed assets.
2. Share prices of such companies are sensitive to any changes in dividend payout.	2. Distribution of earnings reduces the funds of the company. They retain all the earnings and declare bonus shares to offset the dividend requirements of the shareholders.
3. A small portion of the earnings is kept to meet emergent and occasional financial needs.	3. These companies increase the amount of dividends gradually as the profitable investment opportunities start falling.

(b) Constraints on Paying Dividends

- (i) **Legal:** Please see point no. (9) under the heading, "Determinants of Dividend Decisions".
- (ii) **Liquidity:** Payment of dividends means outflow of cash. Ability to pay dividends depends on cash and liquidity position of the firm. A mature company does not have much investment opportunities, nor its funds tied up in permanent working capital and, therefore has a sound cash position. A growth oriented company in spite of having good profits need funds to expand its operations and permanent working capital and therefore it is less likely to declare dividends.
- (iii) **Access to the Capital Market:** By paying large dividends, cash position is affected. So, if new shares have to be issued to raise funds for financing investment programmes and if the existing shareholders cannot buy additional shares, then their control is diluted. In such a situation, payment of dividends may be withheld and earnings are utilised for financing firm's investment opportunities.

- (iv) **Investment Opportunities:** If investment opportunities are inadequate, it is better to pay dividends and raise external funds whenever necessary for such opportunities.
- (c) **Payout policies:** Payout policies can be maintained by fixing the amount or rate of dividend irrespective of the earnings of the company. The policies may include:
- (i) **Constant Dividend Policy:** Shareholders are given fixed amount of dividend irrespective of actual earnings. The amount of dividend may increase or decrease later on depending upon the financial health of the company but it is generally maintained for a considerable period of time.



To maintain a constant dividend amount, it is necessary to create a reserve like Dividend Equalisation Reserve Fund earmarked by marketable securities for accumulation of surplus earnings and to use it for paying dividends in those years where the company's performance is not good. This policy treats common shareholders at par with preference shareholders without giving them any preferred opportunities within the firm. It is preferred by persons and institutions that depend on dividend income to meet their living and operating expenses.

Companies that use constant dividend policy, their dividend fluctuate with earnings in short term.

- (ii) **Stable Dividend Policy:** The ratio of dividend to earnings is known as Payout ratio. Some companies follow a policy of constant Payout ratio i.e. paying fixed percentage on net earnings every year. To quote from Page 74 of the annual report 2011 of Infosys Technologies Limited,

"The Dividend Policy is to distribute up to 30% of the Consolidated Profit after Tax (PAT) of the Infosys Group as Dividend."

Contrary to this, Warren Buffet (amongst the richest persons of the world) says:

"We will either pay large dividends or none at all if we can't obtain more money through re-investment (of those funds). There is no logic to regularly paying out 10% or 20% of earnings as dividends every year."

Such a policy (as mentioned by Warren Buffet) envisages that the amount of dividend fluctuates in direct proportion to earnings. If a company adopts 40% payout ratio, then 40% of every rupee of net earnings will be paid out. If a company earns ₹ 2 per share, dividend per share will be 80 paise and if it earns ₹ 1.50 per share, dividend per share will be 60 paise.

Hence, such a policy is related to company's ability to pay dividends. For losses incurred, no dividend shall be paid. Internal financing with retained earnings is automatic. At any given payout ratio, amount of dividend and any addition to retained earnings increase with increased earnings and decrease with decreased earnings. This policy has a conservative approach and provides a guarantee against over/underpayment.

Company that use a stable dividend policy base dividend on a long-term forecast of sustainable earnings and increase dividends when earnings have increased to a substantially higher level.

The detailed explanation of target payout ratio is covered under the Lintner's model as below:

Lintner's Model

Lintner's model has two parameters:

- i. The target payout ratio,
- ii. The spread at which current dividends adjust to the target.

John Lintner based his model on a series of interviews which he conducted with corporate managers in the mid 1950's. While developing the model, he considers the following assumptions:

1. Firms have a **long term dividend payout ratio**. They maintain a fixed dividend payout over a long term. Mature companies with stable earnings may have high payouts and growth companies usually have low payouts.
2. Managers are more concerned with changes in dividends than the absolute amounts of dividends. A manager may easily decide to pay a dividend of ₹ 2

per share if last year too it was ₹ 2 but paying ₹ 3 dividend if last year dividend was ₹ 2 is an important financial management decision.

3. Dividend changes follow changes in long run sustainable earnings.
4. Managers are **reluctant to affect dividend changes** that may have to be reversed.

Under Lintner's model, the current year's dividend is dependent on current year's earnings and last year's dividend.

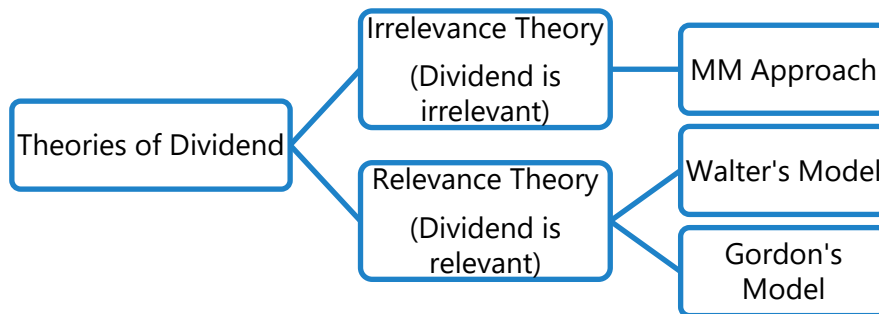
$$D_1 = D_0 + [(EPS \times \text{Target payout}) - D_0] \times Af$$

Where,

- D_1 = Dividend in year 1
 D_0 = Dividend in year 0 (last year dividend)
 EPS = Earnings per share
 Af = Adjustment factor or Speed of adjustment



8. THEORIES OF DIVIDEND



8.1 Dividend's Irrelevance Theory

MODIGLIANI and MILLER (MM) HYPOTHESIS:

Modigliani – Miller theory was proposed by Franco Modigliani and Merton Miller in 1961. MM approach is in support of the irrelevance of dividends i.e. firm's dividend policy has no effect on either the price of a firm's stock or its cost of capital.

According to MM Hypothesis

- Market value of equity shares of a firm depends solely on its earning power and is not influenced by the manner in which its earnings are split between dividends and retained earnings.
- Market value of equity shares is not affected by dividend size.
- Under MM hypothesis there is no meaningful distinction between dividend and share repurchases. They both are ways for a company to return cash to shareholders.

Assumptions of MM Hypothesis

MM hypothesis is based on the following assumptions:

- **Perfect capital markets:** The firm operates in a market in which all investors are rational and information is freely available to all.
- **No taxes:** There are no taxes or no tax discrimination between dividend income and capital appreciation (capital gain). It means there is no difference in taxation of dividend income or capital gain. This assumption is necessary for the universal applicability of the theory, since the tax rates may be different in different countries.
- **Fixed investment policy:** It is necessary to assume that all investment should be financed through equity only, since implication after using debt as a source of finance may be difficult to understand. Further, the impact will be different in different cases.
- **No floatation or transaction cost:** Similarly, these costs may differ from country to country or market to market.
- **Risk of uncertainty does not exist.** Investors are able to forecast future prices and dividend with certainty and one discount rate is appropriate for all securities and all time periods.

Situations under MM Hypothesis

Keeping in mind assumptions under MM Hypothesis, firms may have three possible situations regarding the payment of dividend as follows:

1. **Firm pays cash dividends from Reserve & Surplus:** In this situation, the shareholders receive cash (dividend) from the firm, thereby, reducing the cash balance of the firm. There is only transfer of asset (cash) from one pocket to

another pocket of the shareholders with no net gain or loss. So, payment of cash dividend will not affect the value of the firm.

2. **Firm pays cash dividends from new issue of shares:** If the firm does not have sufficient cash available for dividend, it will issue new shares and therefore will use the amount received for the payment of dividend. Here, shareholders receive cash (dividend) but suffer an equal amount of capital loss due to dilution of control over the assets of the company and dilution in earning per share. With the increase in the total number of shares, earning per share will also reduce. Thus, there is no change in the wealth of shareholders.
3. **Firm does not pay any dividend:** When the firm doesn't pay any dividend, but shareholder want to receive cash, then shareholder may sell part of his/her shareholding in market. Therefore, the cash received in the hands of the shareholder may be known as "home-made dividend". In this situation also, the shareholder receives cash (capital receipt) but lose in the form of capital loss due to dilution of control over the assets of the company among the existing and new shareholders. Hence, there will be no gain or loss and the value of the firm will remain unchanged.

In all the above 3 cases, any new additional investment requirement as well as earnings done for the year are taken into account for assessing the financing needs for issue of new shares.

Let us understand the different possible situations through an example as below:

Example – 2:

At the end of the current Financial Year, Dev Ltd. has 2 lakhs outstanding equity shares with market price of ₹ 10 per share with no other external borrowings since the company follows no borrowing policy. The company has used all its retained earnings for capital expenditure. The company also pays a constant dividend of ₹ 3 per share and its cost of capital is 10%.

Now analysing both situations i.e. when dividends are (i) not paid and (ii) paid.

- (i) If dividends are not paid, then the total no. of equity shares will remain same as no new shares are issued.

$$\begin{aligned}\text{Market price per share (P}_1\text{)} &= P_0 (1 + K_e) - D_1 \\ &= 10 (1 + 0.10) - 0 = ₹ 11\end{aligned}$$

$$\text{Value of Firm} = ₹ 11 \times 2,00,000 \text{ shares} = ₹ 22,00,000$$

- (ii) As the company strictly follows the no borrowing policy, then to pay the dividend of ₹ 3 per share, it will have to issue new shares to finance the dividend payment as no retained earnings is available.

$$\begin{aligned}\text{Market price per share (P}_1\text{)} &= P_0 (1 + K_e) - D_1 \\ &= 10 (1 + 0.10) - 3 = ₹ 8\end{aligned}$$

$$\begin{aligned}\text{No. of new shares to be issued} &= \frac{\text{Funds required (i.e. total dividend to be paid)}}{P_1} \\ &= \frac{2,00,000 \text{ shares} \times ₹ 3}{₹ 8} = 75,000 \text{ shares}\end{aligned}$$

$$\text{Value of Firm} = ₹ 8 \times 2,75,000 \text{ shares} = ₹ 22,00,000$$

Thus, it can be seen from the above example that the value of the firm remains the same in either case.

MM hypothesis is primarily based on the arbitrage argument. Through the arbitrage process, MM hypothesis discusses how the value of the firm remains same whether the firm pays dividend or not. Here, **market price of shares can be calculated as follows:**

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

Where,

P_0 = Price in the beginning of the period

P_1 = Price at the end of the period

D_1 = Dividend at the end of the period

K_e = Cost of equity/ rate of capitalization/ discount rate

As per MM hypothesis, the value of firm will remain unchanged due to dividend decision. This can be computed with the help of the following formula:

$$V_f \text{ or } nP_0 = \frac{(n + \Delta n)P_1 - I + E}{(1 + K_e)}$$

Where,

V_f = Value of firm in the beginning of the period

n = Number of shares in the beginning of the period

Δn = Number of shares issued to raise the funds required

I = Amount required for investment

E = Total earnings during the period

For Understanding purpose:

$$P_o = \frac{P_1 + D_1}{1 + K_e}$$

The above equation is for one share. Let's multiply it with n i.e. existing number of shares on both sides:

$$nP_o = \frac{nP_1 + nD_1}{1 + K_e}$$

Now add ΔnP_1 and subtract ΔnP_1 at numerator of the right hand side equation

$$nP_o = \frac{nP_1 + nD_1 + \Delta nP_1 - \Delta nP_1}{1 + K_e}$$

Further, retained earnings could be represented with the help of following:

$$\text{Retained earnings} = E - nD_1$$

Δn i.e. number of shares issued to raise the funds required can be represented as follows:

$$\Delta n = \frac{\text{Funds required}}{\text{Price at end } (P_1)} = \frac{I - (E - nD_1)}{P_1}$$

$$\text{Or, } \Delta nP_1 = I - (E - nD_1)$$

Now putting value of ΔnP_1 in the equation:

$$nP_o = \frac{nD_1 + (nP_1 + \Delta nP_1) - [I - (E - nD_1)]}{1 + K_e}$$

$$nP_o = \frac{nD_1 + (n + \Delta n)P_1 - I + E - nD_1}{1 + K_e}$$

$$nP_o = \frac{(n + \Delta n)P_1 - I + E}{(1 + K_e)}$$

Advantages of MM Hypothesis

1. This model is **logically consistent**.
2. It provides a **satisfactory framework** on dividend policy with the concept of Arbitrage process.

Limitations of MM Hypothesis

1. Validity of various **assumptions is questionable**.
2. This model **may not be valid under uncertainty**.

ILLUSTRATION 1

AB Engineering Ltd. belongs to a risk class for which the capitalization rate is 10%. It currently has outstanding 10,000 shares selling at ₹ 100 each. The firm is contemplating the declaration of a dividend of ₹ 5 share at the end of the current financial year. It expects to have a net income of ₹ 1,00,000 and has a proposal for making new investments of ₹ 2,00,000. CALCULATE the value of the firm when dividends (i) are not paid (ii) are paid.

SOLUTION

CASE 1: Value of the firm when dividends are not paid.

Step 1: Calculate price at the end of the period

$$K_e = 10\%, \quad P_0 = 100, \quad D_1 = 0$$

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 0}{1 + 0.10} \quad \gg \quad P_1 = 110$$

Step 2: Calculation of funds required for investment

Earning	₹ 1,00,000
Dividend distributed	Nil
Fund available for investment	₹ 1,00,000
Total Investment	₹ 2,00,000
Balance Funds required	₹ 2,00,000 - ₹ 1,00,000 = ₹ 1,00,000

Step 3: Calculation of No. of shares required to be issued for balance funds

$$\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end}(P_1)}$$

$$\Delta n = \frac{1,00,000}{110}$$

Step 4: Calculation of value of firm

$$nP_0 = \frac{(n + \Delta n)P_1 - I + E}{1 + K_e}$$

$$\begin{aligned} nP_0 &= \frac{\left(10,000 + \frac{₹ 1,00,000}{₹ 110}\right) \times ₹ 110 - ₹ 2,00,000 + ₹ 1,00,000}{(1 + 0.10)} \\ &= ₹ 10,00,000 \end{aligned}$$

CASE 2: Value of the firm when dividends are paid.

Step 1: Calculate price at the end of the period

$$K_e = 10\%, \quad P_0 = 100, \quad D_1 = 5$$

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 5}{1 + 0.10} \quad \gg \quad P_1 = 105$$

Step 2: Calculation of funds required for investment

Earning	₹ 1,00,000
Dividend distributed	₹ 50,000
Fund available for investment	₹ 50,000
Total Investment	₹ 2,00,000
Balance Funds required	₹ 2,00,000 - ₹ 50,000 = ₹ 1,50,000

Step 3: Calculation of No. of shares required to be issued for balance fund

$$\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end (P}_1\text{)}}$$

$$\Delta n = \frac{\text{₹ 1,50,000}}{\text{₹ 105}}$$

Step 4: Calculation of value of firm

$$nP_0 = \frac{(n + \Delta n)P_1 - I + E}{1 + K_e}$$

$$nP_0 = \frac{\left(10,000 + \frac{\text{₹ 1,50,000}}{\text{₹ 105}}\right) \times \text{₹ 105} - \text{₹ 2,00,000} + \text{₹ 1,00,000}}{(1 + 0.10)}$$

$$= \text{₹ 10,00,000}$$

Thus, it can be seen from the above illustration that the value of the firm remains the same in either case.

In real world, market imperfections create some problems for MM's dividend policy irrelevance proposition.

8.2 Dividend's Relevance Theory

1. WALTER'S MODEL

Assumptions of Walter's Model

Walter's approach is based on the following assumptions:

- All investment proposals of the firm are to be financed **through retained earnings** only.
- 'r' rate of return & 'K_e' cost of capital are **constant**.
- **Perfect capital markets:** The firm operates in a market in which all investors are rational and information is freely available to all.
- **No taxes or no tax discrimination** between dividend income and capital appreciation (capital gain). It means there is no difference in taxation of dividend income or capital gain. This assumption is necessary for the universal applicability of the theory, since, the tax rates may be different in different countries.

- **No floatation or transaction cost:** Similarly, these costs may differ country to country or market to market.
- The firm has **perpetual life**

The relationship between dividend and share price based on Walter's formula is shown below:

$$\text{Market Price (P)} = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where,

P = Market Price of the share.

E = Earnings per share.

D = Dividend per share.

K_e = Cost of equity/ rate of capitalization/ discount rate.

r = Internal rate of return/ return on investment

The above formula is given by Prof. James E. Walter which shows how dividend can be used to maximise the wealth of equity holders. He argues that in the long run, share prices reflect only the present value of expected dividends. Retentions influence stock prices only through their effect on further dividends.

A close study of the formula indicates that Professor Walter emphasises two factors which influence the market price of a share which are:

- (1) Dividend per share
- (2) Relationship between Internal Rate of Return (IRR) and Cost of capital (K_e) [i.e. Market capitalization rate]

If the internal return of retained earnings is higher than market capitalization rate, the value of ordinary shares would be high even if dividends are low. However, if the internal return within the business is lower than what the market expects, the value of the share would be low. In such a case, shareholders would prefer a higher dividend so that they can utilise the funds so obtained elsewhere in more profitable opportunities.

Walter's Model explains why market prices of shares of growing companies are high even though the dividend paid out is low. It also explains why the market price

of shares of certain companies which pay higher dividends and retain very low profits is also high.

As explained above, market price is dependent upon two factors; firstly, the quantum of dividend and secondly, profitable opportunities available to the company in investing the earnings retained. It is obvious that when a company retains a part of its profits, it has to think in terms of the cost of such retention. Retention of profits depends upon whether it is cheaper and more profitable for shareholders of the company to have corporate earnings retained in the business or get the same in the form of cash dividend. This involves a comparison between the cost of retained earnings and the cost of distributing them. The cost of retained earnings, therefore, involves an opportunity cost, i.e., the benefits which shareholders forego in terms of leaving the funds in the business.

IRR, K_e and optimum payout

As we know that Walter's approach considers two factors, following can be concluded from this model:

Company	Condition of r vs K_e	Correlation between Size of Dividend and Market Price of share	Optimum dividend payout ratio
Growth	$r > K_e$	Negative	Zero
Constant	$r = K_e$	No correlation	Every payout ratio is optimum
Decline	$r < K_e$	Positive	100%

Growth Oriented Company: In this condition, a company is able to invest/utilize the fund in a better manner. Therefore, shareholders can accept low dividend because their value of share would be higher.

Declining Company: In this condition, a company is not in a position to cover the cost of capital. Therefore, shareholders would prefer a higher dividend so that they can utilize their funds elsewhere in more profitable opportunities.

Advantages of Walter's Model

1. The formula is **simple to understand** and easy to compute.

2. It can envisage **different possible market prices** in different situations and considers internal rate of return, market capitalisation rate and dividend payout ratio in the determination of market value of shares.

Limitations of Walter's Model

1. The formula **does not consider all the factors** affecting dividend policy and share prices. Moreover, determination of market capitalisation rate is difficult.
2. Further, the formula **ignores such factors as taxation**, various legal and contractual obligations, management policy and attitude towards dividend policy and so on.

ILLUSTRATION 2

XYZ Ltd. earns ₹ 10/ share. Capitalization rate and return on investment are 10% and 12% respectively.

DETERMINE the optimum dividend payout ratio and the price of the share at the payout.

SOLUTION

Since $r > K_e$, the optimum dividend pay-out ratio would 'Zero' (i.e. $D = 0$),

Accordingly, value of a share:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

$$P = \frac{0 + \frac{0.12}{0.10}(10 - 0)}{0.10} = ₹120$$

The optimality of the above payout ratio can be proved by using 25%, 50%, 75% and 100% as pay- out ratio:

At 25% pay-out ratio

$$P = \frac{2.5 + \frac{0.12}{0.10}(10 - 2.5)}{0.10} = ₹ 115$$

At 50% pay-out ratio

$$P = \frac{5 + \frac{0.12}{0.10}(10 - 5)}{0.10} = ₹ 110$$

At 75% pay-out ratio

$$P = \frac{7.5 + \frac{0.12}{0.10}(10 - 7.5)}{0.10} = ₹ 105$$

At 100% pay-out ratio

$$P = \frac{10 + \frac{0.12}{0.10}(10 - 10)}{0.10} = ₹ 100$$

ILLUSTRATION 3

The following figures are collected from the annual report of XYZ Ltd.:

Net Profit	₹ 30 lakhs
Outstanding 12% preference shares	₹ 100 lakhs
No. of equity shares	3 lakhs
Return on Investment	20%
Cost of capital i.e. (K_e)	16%

COMPUTE the approximate dividend pay-out ratio so as to keep the share price at ₹ 42 by using Walter's model?

SOLUTION

	₹ in lakhs
Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Earning per share	$18/3 = ₹ 6.00$

Let, the dividend per share be D to get share price of ₹ 42

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

$$\begin{aligned}
 ₹ 42 &= \frac{D + \frac{0.20}{0.16}(6 - D)}{0.16} \\
 6.72 &= \frac{0.16D + 1.2 - 0.20D}{0.16} \\
 0.04D &= 1.2 - 1.0752 \\
 D &= 3.12 \\
 \text{D/P ratio} &= \frac{\text{DPS}}{\text{EPS}} \times 100 = \frac{3.12}{6} \times 100 = 52\%
 \end{aligned}$$

So, the required dividend payout ratio will be = 52%

2. GORDON'S MODEL

According to Gordon's model, dividend is relevant and dividend policy of a company affects its value.

Assumptions of Gordon's Model

This model is based on the following assumptions:

- Firm is an all equity firm i.e. **no debt**.
- **IRR will remain constant**, because change in IRR will change the growth rate and consequently the value will be affected. Hence this assumption is necessary.
- **K_e will remain constant**, because change in discount rate will affect the present value.
- **Retention ratio** (b), once decided upon, is **constant** i.e. constant dividend payout ratio will be followed.
- **Growth rate** (g = br) is also **constant**, since retention ratio and IRR will remain unchanged and growth, which is the function of these two variables, will remain unaffected.
- K_e > g, this assumption is necessary and based on the principles of series of sum of geometric progression for 'n' number of years.
- All investment proposals of the firm are to be **financed through retained earnings** only.

The following formula is used by Gordon to find out price per share:

$$P_0 = \frac{E_1(1-b)}{K_e - br}$$

Where,

P_0 = Price per share

E_1 = Earnings per share

b = Retention ratio; $(1 - b)$ = Payout ratio)

K_e = Cost of capital

r = IRR

br = Growth rate (g)

According to Gordon's model, when **IRR is greater than cost of capital, the price per share increases and dividend pay-out decreases**. On the other hand, when IRR is lower than the cost of capital, the price per share decreases and dividend pay-out increases.

Following is the conclusion of Gordon's model:

Company	Condition of r vs K_e	Optimum dividend payout ratio
Growth	$r > K_e$	Zero
Constant	$r = K_e$	There is no optimum ratio
Declining	$r < K_e$	100%

ILLUSTRATION 4

The following figures are collected from the annual report of XYZ Ltd.:

Net Profit	₹ 30 lakhs
Outstanding 12% preference shares	₹ 100 lakhs
No. of equity shares	3 lakhs
Return on Investment	20%
Cost of capital i.e. (K_e)	16%

CALCULATE price per share using Gordon's Model when dividend pay-out is (i) 25%; (ii) 50% and (iii) 100%.

SOLUTION

	₹ in lakhs
Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Earning per share	18/3 = ₹ 6.00

Price per share according to Gordon's Model is calculated as follows:

$$P_0 = \frac{E_1(1-b)}{K_e - br}$$

Here, $E_1 = 6$, $K_e = 16\%$

(i) When dividend pay-out is 25%

$$P_0 = \frac{6 \times 0.25}{0.16 - (0.75 \times 0.2)} = \frac{1.5}{0.16 - 0.15} = 150$$

(ii) When dividend pay-out is 50%

$$P_0 = \frac{6 \times 0.5}{0.16 - (0.5 \times 0.2)} = \frac{3}{0.16 - 0.10} = 50$$

(iii) When dividend pay-out is 100%

$$P_0 = \frac{6 \times 1}{0.16 - (0 \times 0.2)} = \frac{6}{0.16} = 37.50$$

The "Bird-in-hand theory" – Gordon's Revised Model

Myron Gordon revised his dividend model and considered the risk and uncertainty in his model. The Bird-in-hand theory of Gordon has two arguments:

- (i) Investors are **risk averse** and
- (ii) Investors put a **premium on certain return** and discount on uncertain return.

Gordon argues that what is available at present is preferable to what may be available in the future. As investors are rational, they want to avoid risk and uncertainty. They would prefer to pay a higher price for shares on which current dividends are paid. Conversely, they would discount the value of shares of a firm which postpones dividends. The discount rate would vary with the retention rate.

The relationship between dividend and share price on the basis of Gordon's formula is shown as:

$$\text{Market price per share}(P_0) = \left[\frac{D_0(1+g)}{K_e - g} \right]$$

Where,

- P_0 = Market price per share (ex-dividend)
- D_0 = Current year dividend
- g = Constant annual growth rate of dividends
- K_e = Cost of equity capital (expected rate of return).

The formula given by Gordon shows that when the rate of return (r) is greater than the discount rate (K_e), the price per share increases as the dividend ratio decreases and the vice-versa. On the other hand, if the rate of return (r) is less than discount rate (K_e), the price per share increases as the dividend ratio increases and the vice-versa. The price per share remains unchanged where the rate of return and discount rate are equal.

Dividend Discount Model (DDM)

It is a financial model that values shares at the discounted value of the future dividend payments. Under this model, the price of a share that will be traded is calculated by the PV of all expected future dividend payment discounted by an appropriate risk-adjusted rate. The dividend discount model price is the intrinsic value of the stock i.e.

Intrinsic value = Sum of PV of future cash flows

Intrinsic value = Sum of PV of Dividends + PV of Stock Sale Price

$$\text{Stock Intrinsic Value} = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \dots + \frac{D_n}{(1+K_e)^n} + \frac{RV_n}{(1+K_e)^n}$$

In the above equation, it is assumed that dividend is paid at the end of each year and that the stock is sold at the end of the n th year.

There can be three possible situations:



(a) Zero Growth Rate: assumes all dividend paid by a stock remains same. In this case the stock price would be equal to:

$$\text{Stock's intrinsic Value} = \frac{\text{Annual dividend}}{\text{Required rate of return}}$$

$$\text{i.e. } P_0 = \frac{D}{K_e}$$

Where,

D = Annual dividend

K_e = Cost of capital

P_0 = Current Market price of share

ILLUSTRATION 5

X Ltd. is a no growth company, pays a dividend of ₹ 5 per share. If the cost of capital is 10%, COMPUTE the current market price of the share?

SOLUTION

$$P_0 = \frac{D}{K_e} = \frac{5}{0.10} = ₹ 50$$

(b) Constant Growth Rate (Gordon's Growth Model): The relationship between dividend and share price on the basis of Gordon's formula is:

$$\text{Market price per share (P)} = \frac{D_0(1+g)}{K_e - g}$$

Where

P = Market price per share

D_0 = current year dividend

g = growth rate of dividends

K_e = cost of equity capital/ expected rate of return

Notes:

$g = b \times r$

b = proportion of retained earnings or (1- dividend payout ratio)

ILLUSTRATION 6

XYZ is a company having share capital of ₹ 10 lakhs of ₹ 10 each. It distributed current dividend of 20% per annum. Annual growth rate in dividend expected is 2%. The expected rate of return on its equity capital is 15%. CALCULATE price of share applying Gordon's growth Model.

SOLUTION

$$P = \frac{D_0(1+g)}{K_e - g}$$
$$= \frac{2(1+0.02)}{0.15 - 0.02} = ₹ 15.69$$

(c) Variable Growth Rate : Variable-growth rate models (multi-stage growth models) can take many forms, even assuming the growth rate is different for every year. However, the most common form is one that assumes 3 different rates of growth: an initial high rate of growth, a transition to slower growth, and lastly, a sustainable, steady rate of growth. Basically, the constant-growth rate model is extended, with each phase of growth calculated using the constant-growth method but using 3 different growth rates of the 3 phases. The present values of each stage are added together to derive the intrinsic value of the stock. Sometimes, even the capitalization rate, or the required rate of return, may be varied if changes in the rate are projected. This is also referred to as 3 staged growth model.

ILLUSTRATION 7

A firm had paid dividend at ₹ 2 per share last year. The estimated growth of the dividends from the company is estimated to be 5% p.a. DETERMINE the estimated market price of the equity share if the estimated growth rate of dividends (i) rises to 8%, and (ii) falls to 3%. Also FIND OUT the present market price of the share, given that the required rate of return of the equity investors is 15%.

SOLUTION

In the present situation, the current MPS is as follows:

$$P = \frac{D_0(1+g)}{K_e - g}$$

$$P = \frac{2(1+0.05)}{0.15 - 0.05} = ₹ 21$$

(i) The impact of changes in growth rate to 8% on MPS will be as follows:

$$P = \frac{2(1+0.08)}{0.15 - 0.08} = ₹ 30.86$$

(ii) The impact of changes in growth rate to 3% on MPS will be as follows:

$$P = \frac{2(1+0.03)}{0.15 - 0.03} = ₹ 17.17$$

So, the market price of the share is expected to vary in response to change in expected growth rate of dividends.

Advantages of Gordon's Model

1. The dividend discount model is a **useful heuristic model** that relates the present stock price to the present value of its future cash flows.
2. This Model is **easy to understand**.

Limitations of Gordon's Model

1. The dividend discount model **depends** on projections about company growth rate and future capitalization rates of the remaining cash flows, which may be **difficult to calculate accurately**.
2. The **true intrinsic value** of a stock is **difficult to determine** realistically.

Important considerations for Gordon's Model

1. With dividends growing at constant rate of g , the share price also grows at g .

$$P_0 = D_1/(r-g)$$

Multiplying both sides by $(1+g)$ gives as follows:

$$P_0 (1+g) = D_1 (1+g)/(r-g)$$

$$P_1 = D_2/(r-g)$$

So both dividend and price have grown at the rate of g given r is constant.

2. Growth rate g is also referred to as capital appreciation or capital yield.
3. The dividend yield which is D_1/P_0 at $t=0$ will be constant as both dividend and price are expected to grow at the same rate, leaving dividend yield unchanged.

9. STOCK SPLITS

9.1 Meaning of Stock Split

Stock split means splitting **one share into many**, say, one share of ₹ 500 into 5 shares of ₹ 100. Stock splits is a tool used by the companies to regulate the prices of shares i.e. if a share price increases beyond a limit, it may become less tradable, for e.g. suppose a company's share price increases from ₹ 50 to ₹ 1000 over the years, it is possible that it might goes out of range of many investors.

9.2 Advantages of Stock Splits

1. It makes the **share affordable** to small investors.
2. **Number of shares may increase** the number of shareholders; hence the potential of investment may increase.

9.3 Limitations of Stock Splits

1. **Additional expenditure** needs to be incurred on the process of stock split.
2. **Low share price may attract speculators** or short term investors, which are generally not preferred by any company.

10. SHARE BUYBACK

10.1 Meaning of Share Buyback

Share buyback, in simple terms, means buying/repurchasing own shares by the company resulting into decrease in share capital of the company. Thus, the shares bought back are cancelled leading reduction in outstanding number of shares.

Share buyback is also a form of shareholders' dividend. As the number of circulating shares in the market fall, amount of dividend per share in the future increases.

There are two main types of buyback that can be performed by the companies. One is through an open market, and another is through tender offer. While company intending to buyback through open market, it need to go through secondary market. However, in case of tender offer, company offers a fixed price where all the shareholders can participate or sell their shares.

Miscellaneous Illustrations

ILLUSTRATION 8

RST Ltd. has a capital of ₹ 10,00,000 in equity shares of ₹ 100 each. The shares are currently quoted at par. The company proposes to declare a dividend of ₹ 10 per share at the end of the current financial year. The capitalization rate for the risk class of which the company belongs is 12%. COMPUTE market price of the share at the end of the year, if

- (i) dividend is not declared
- (ii) dividend is declared

Assuming that the company pays the dividend and has net profits of ₹ 5,00,000 and makes new investments of ₹ 10,00,000 during the period, CALCULATE number of new shares to be issued? Use the MM model.

SOLUTION

Given,

Cost of Equity (K_e)	12%
Number of shares in the beginning (n)	10,000
Current Market Price (P_0)	₹ 100
Net Profit (E)	₹ 5,00,000
Expected Dividend (D_1)	₹ 10 per share
Investment (I)	₹ 10,00,000

Computation of market price per share, when:

(i) **No dividend is declared:**

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$100 = \frac{P_1 + 0}{1 + 0.12}$$

$$P_1 = 112 - 0 = ₹ 112$$

(ii) **Dividend is declared:**

$$100 = \frac{P_1 + 10}{1 + 0.12}$$

$$P_1 = 112 - 10 = ₹ 102$$

Calculation of number of shares required for investment

	₹
Earning	5,00,000
Dividend distributed	1,00,000
Fund available for investment	4,00,000
Total Investment	10,00,000
Balance Funds required	10,00,000 - 4,00,000 = 6,00,000

$$\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end}(P_1)}$$

$$\Delta n = \frac{6,00,000}{102} = 5,882.35 \text{ or } 5,883 \text{ Shares}$$

ILLUSTRATION 9

The following information pertains to M/s XY Ltd.

Earnings of the Company	₹ 5,00,000
Dividend Payout ratio	60%
No. of shares outstanding	1,00,000

Equity capitalization rate	12%
Rate of return on investment	15%

CALCULATE:

- (i) Market value per share as per Walter's model.
- (ii) Optimum dividend payout ratio according to Walter's model and the market value of Company's share at that payout ratio.

SOLUTION

- (i) As per Walter's model:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where,

P = Market price per share.

E = Earnings per share = ₹ 5

D = Dividend per share = ₹ 3

R = Return earned on investment = 15%

K_e = Cost of equity capital = 12%

$$P = \frac{3 + \frac{0.15}{0.12}(5 - 3)}{0.12} = ₹ 45.83$$

- (ii) According to Walter's model, when the return on investment is more than the cost of equity capital, the price per share increases as the dividend pay-out ratio decreases. Hence, the optimum dividend pay-out ratio in this case is nil.

So, at a pay-out ratio of zero, the market value of the company's share will be:

$$P = \frac{0 + \frac{0.15}{0.12}(5 - 0)}{0.12} = ₹ 52.08$$

ILLUSTRATION 10

Taking an example of three different firms i.e. growth, normal and declining, CALCULATE the share price using Gordon's model.

Factors	Growth	Normal	Declining
---------	--------	--------	-----------

	Firm $r > K_e$	Firm $r = K_e$	Firm $r < K_e$
r (rate of return on retained earnings)	15%	10%	8%
K_e (Cost of Capital)	10%	10%	10%
E (Earning Per Share)	₹ 10	₹ 10	₹ 10
b (Retained Earnings)	0.6	0.6	0.6
$1 - b$ (Dividend Payout)	0.4	0.4	0.4

SOLUTION

$$P_0 = \frac{E_1(1-b)}{K_e - br}$$

(i) Situation-1: Growth Firm $r > K_e$

$$P_0 = \frac{10(1-0.6)}{0.10 - 0.15 \times 0.6} = \frac{4}{0.10 - 0.09} = ₹ 400$$

(ii) Situation-2: Normal Firm $r = K_e$

$$P_0 = \frac{10(1-0.6)}{0.10 - 0.10 \times 0.6} = \frac{4}{0.10 - 0.06} = ₹ 100$$

(ii) Situation-2: Normal Firm $r < K_e$

$$P_0 = \frac{10(1-0.6)}{0.10 - 0.08 \times 0.6} = \frac{4}{0.10 - 0.048} = ₹ 76.92$$

If the retention ratio (b) is changed from 0.6 to 0.4, the new share price will be as follows:

Growth Firm

$$P_0 = \frac{10(1-0.4)}{0.10 - 0.15 \times 0.4} = \frac{6}{0.10 - 0.06} = ₹ 150$$

Normal Firm

$$P_0 = \frac{10(1-0.4)}{0.10 - 0.10 \times 0.4} = \frac{6}{0.10 - 0.04} = ₹ 100$$

Declining Firm

$$P_0 = \frac{10(1-0.4)}{0.10-0.08 \times 0.4} = \frac{6}{0.10-0.032} = ₹ 88.24$$

From the above analysis, it can be concluded that:

When $r > k$, the market value increases with retention ratio.

When $r < k$, the market value of share stands to decrease.

When $r = k$, the market value is not affected by dividend policy.

The conclusion of the Gordon's model is similar to that of Walter's model.

ILLUSTRATION 11

The following information is given below in case of Aditya Ltd.:

Earnings per share = ₹ 60

Capitalisation rate = 15%

Return on investment = 25%

Dividend payout ratio = 30%

- (i) *COMPUTE price per share using Walter's Model.*
- (ii) *WHAT would be optimum dividend payout ratio per share under Gordon's Model.*

SOLUTION

- (i) **As per Walter's Model, Price per share is computed by using the following formula:**

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e}$$

Where,

P = Market Price of the share.

E = Earnings per share.

D = Dividend per share.

K_e = Cost of equity/ rate of capitalization/ discount rate.

r = Internal rate of return/ return on investment

Applying the above formula, price per share

$$P = \frac{18 + \frac{0.25}{0.15}(60 - 18)}{0.15}$$

$$\text{Or, } P = \frac{18 + 70}{0.15} = ₹ 586.67$$

- (ii) **As per Gordon's model, when $r > K_e$, optimum dividend payout ratio is 'Zero'.**

SUMMARY

Dividend decision is one of the most important areas of management decisions. It is easy to understand but difficult to implement. Generally, the dividend can be in the form of **Cash Dividend** and **Stock Dividend**.

Dividend policy is generally governed by long term financing decision and wealth maximization decision. Some other factors also play major role in this decision like growth opportunities, expectation of shareholders, trend of the industry, legal constraints etc.

The three major theories of dividend decision are classified under irrelevance (M.M. Hypothesis) and relevance category (Walter's model & Gordon's Model). However, few other theories studied in this chapter are Graham & Dodd's model and Lintner model.

According to the Graham & Dodd, the stock market places considerable weight on dividends than on retained earnings.

$$P = m \left(D + \frac{E}{3} \right)$$

Where,

P = Market price per share

D = Dividend per share

E = Earnings per share

m = a multiplier

Further, we studied **stock splits** as a tool to maintain price range so that it does not move too high to become unaffordable for a wide range of investors.

TEST YOUR KNOWLEDGE

Multiple Choice Questions (MCQs)

1. Which one of the following is the assumption of Gordon's Model:
 - (a) $K_e > g$
 - (b) Retention ratio, (b), once decide upon, is constant
 - (c) Firm is an all equity firm
 - (d) All of the above
2. What should be the optimum Dividend pay-out ratio, when $r = 15\%$ & $K_e = 12\%$:
 - (a) 100%
 - (b) 50%
 - (c) Zero
 - (d) None of the above.
3. Which of the following is the irrelevance theory?
 - (a) Walter model
 - (b) Gordon model
 - (c) M.M. hypothesis
 - (d) Lintner's model
4. If the company's D/P ratio is 60% & ROI is 16%, what should be the growth rate?
 - (a) 5%
 - (b) 7%
 - (c) 6.4%
 - (d) 9.6%
5. If the shareholders prefer regular income, how does this affect the dividend decision:
 - (a) It will lead to payment of dividend
 - (b) It is the indicator to retain more earnings

- (c) *It has no impact on dividend decision*
 - (d) *Can't say*
6. *Mature companies having few investment opportunities will show high payout ratios, this statement is:*
- (a) *False*
 - (b) *True*
 - (c) *Partial true*
 - (d) *None of these*
7. *Which of the following is the limitation of Lintner's model?*
- (a) *This model does not offer a market price for the shares.*
 - (b) *The adjustment factor is an arbitrary number and not based on any scientific criterion or methods.*
 - (c) *Both (a) & (b)*
 - (d) *None of the above.*
8. *What are the different options other than cash used for distributing profits to shareholders?*
- (a) *Bonus shares*
 - (b) *Stock split*
 - (c) *Both (a) and (b)*
 - (d) *None of the above*
9. *Which of the following statement is correct with respect to Gordon's model?*
- (a) *When IRR is greater than cost of capital, the price per share increases and dividend pay-out decreases.*
 - (b) *When IRR is greater than cost of capital, the price per share decreases and dividend pay-out increases.*
 - (c) *When IRR is equal to cost of capital, the price per share increases and dividend pay-out decreases.*
 - (d) *When IRR is lower than cost of capital, the price per share increases and dividend pay-out decreases.*

10. Compute EPS according to Graham & Dodd approach from the given information:

Market price	₹ 56
Dividend pay-out ratio	60%
Multiplier	2

- (a) ₹ 30
 (b) ₹ 56
 (c) ₹ 28
 (d) ₹ 84
11. Which among the following is not an assumption of Walter's Model?
- (a) Rate of return and cost of capital are constant
 (b) Information is freely available to all
 (c) There is discrimination in taxes
 (d) The firm has perpetual life

Theoretical Questions

1. STATE dividend decision. Briefly EXPLAIN the factors which govern this decision.
2. EXPLAIN the advantages and disadvantages of the stock dividend.
3. DISCUSS the practical considerations in dividend policy.
4. LIST out the assumptions of irrelevance theory.
5. State the meaning of stock split. Explain its advantages and disadvantages.

Practical Problems

1. M Ltd. belongs to a risk class for which the capitalization rate is 10%. It has 25,000 outstanding shares and the current market price is ₹ 100. It expects a net profit of ₹ 2,50,000 for the year and the Board is considering dividend of ₹ 5 per share.

M Ltd. requires to raise ₹ 5,00,000 for an approved investment expenditure. ILLUSTRATE, how the MM approach affects the value of M Ltd. if dividends are paid or not paid.

2. The following information is supplied to you:

	₹
Total Earnings	2,00,000
No. of equity shares (of ₹ 100 each)	20,000
Dividend paid	1,50,000
Price/ Earnings ratio	12.5

Applying Walter's Model:

- (i) ANALYSE whether the company is following an optimal dividend policy.
 - (ii) COMPUTE P/E ratio at which the dividend policy will have no effect on the value of the share.
 - (iii) Will your decision change, if the P/E ratio is 8 instead of 12.5? ANALYSE.
3. With the help of following figures CALCULATE the market price of a share of a company by using:
- (i) Walter's formula
 - (ii) Dividend growth model (Gordon's formula)

Earnings per share (EPS)	₹ 10
Dividend per share (DPS)	₹ 6
Cost of capital (K_e)	20%
Internal rate of return on investment	25%
Retention Ratio	40%

4. The annual report of XYZ Ltd. provides the following information:

Particulars	Amount (₹)
Net Profit	50 lakhs
Outstanding 15% preference shares	100 lakhs
No. of equity shares	5 lakhs
Return on Investment	20%
Cost of capital i.e. (K_e)	16%

CALCULATE price per share using Gordon's Model when dividend pay-out is:

- (i) 25%;*
- (ii) 50%;*
- (iii) 100%.*

5. *A&R Ltd. is a large-cap multinational company listed in BSE in India with a face value of ₹ 100 per share. The company is expected to grow @ 15% p.a. for next four years then 5% for an indefinite period. The shareholders expect 20% return on their share investments. Company paid ₹ 120 as dividend per share for the current Financial Year. The shares of the company traded at an average price of ₹ 3,122 on last day. FIND out the intrinsic value per share and state whether shares are overpriced or underpriced.*
6. *In the month of May of the current Financial Year, shares of RT Ltd. was sold for ₹ 1,460 per share. A long term earnings growth rate of 7.5% is anticipated. RT Ltd. paid dividend of ₹ 20 per share.*
- (i) CALCULATE rate of return an investor can expect to earn assuming that dividends are expected to grow along with earnings at 7.5% per year in perpetuity?*
 - (ii) It is expected that RT Ltd. will earn about 10% on retained earnings and shall retain 60% of earnings. In this case, STATE whether, there would be any change in growth rate and cost of Equity?*
7. *Aakash Ltd. has 10 lakh equity shares outstanding at the start of the accounting year. The existing market price per share is ₹ 150. Expected dividend is ₹ 8 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 10%.*
- (i) CALCULATE the market price per share when expected dividends are: (a) declared, and (b) not declared, based on the Miller – Modigliani approach.*
 - (ii) CALCULATE number of shares to be issued by the company at the end of the accounting year on the assumption that the net income for the year is ₹ 3 crore, investment budget is ₹ 6 crores, when (a) Dividends are declared, and (b) Dividends are not declared.*

- (iii) *PROOF that the market value of the shares at the end of the accounting year will remain unchanged irrespective of whether (a) Dividends are declared, or (ii) Dividends are not declared.*
8. *Mr H is currently holding 1,00,000 shares of HM ltd, and currently the share of HM ltd is trading on Bombay Stock Exchange at ₹50 per share. Mr A have a policy to re-invest the amount of any dividend received into the shared back again of HM ltd. If HM ltd has declared a dividend of ₹10 per share, please determine the no of shares that Mr A would hold after he re-invests dividend in shares of HM ltd.*
9. *Following information is given pertaining to DG ltd,*
- | | |
|---------------------------------|----------------------|
| <i>No of shares outstanding</i> | <i>1 lakh shares</i> |
| <i>Earnings Per share</i> | <i>25 per share</i> |
| <i>P/E Ratio</i> | <i>20</i> |
| <i>Book Value per share</i> | <i>400 per share</i> |
- If company decides to repurchase 25,000 shares, at the prevailing market price, what is the resulting book value per share after repurchasing.*

Case Scenarios

1. *KGF Chemicals Ltd., a prominent player in the chemical industry, faces the challenge of determining its growth trajectory and dividend policy to maximize shareholder value. With expectations of significant growth in the near term and stabilization in the long run, the company must strategically manage its resources to align with investor expectations.*

KGF Chemicals Ltd. is a leading manufacturer and supplier of specialty chemicals catering to diverse industries such as pharmaceuticals, agriculture, and manufacturing. Established with a commitment to innovation and quality, the company has garnered a strong market presence over the years.

The company is projected to experience robust growth at a rate of 14% per annum for the next four years. Subsequently, the growth rate is expected to stabilize at the national economy's rate of 7% indefinitely. This forecast reflects both the company's expansion plans and the broader economic landscape.

KGF Chemicals Ltd. paid a dividend of ₹2 per share last year ($Do = 2$). The management faces the crucial decision of balancing dividend payouts with reinvestment opportunities to sustain growth and meet shareholders'

expectations. The dividend policy must strike a delicate balance between rewarding shareholders and retaining earnings for future investments.

The required rate of return on equity shares is 12%, indicating investors' expected return given the company's risk profile and market conditions. Management must carefully assess investment opportunities to ensure they meet or exceed this threshold, thereby generating value for shareholders over the long term.

In navigating the dynamic landscape of the chemical industry, KGF Chemicals Ltd. must adopt a proactive approach to managing growth and dividend policy. By aligning strategic decisions with investor expectations and market dynamics, the company can position itself for sustainable success while maximizing shareholder value. Continual evaluation and adaptation will be essential to capitalize on growth opportunities and maintain competitiveness in the evolving marketplace.

You are required to answer the following on the basis of above information:

- (i) What is the expected dividend at the end of 4th Year?*
 - (a) ₹2.1097*
 - (b) ₹2.1483*
 - (c) ₹2.9631*
 - (d) ₹3.3779*
- (ii) What is the present value of Expected Dividends to be received in next four years?*
 - (a) ₹11.2202*
 - (b) ₹8.3655*
 - (c) ₹9.8423*
 - (d) ₹6.2176*
- (iii) Determine the Market Price of shares at the end of 4th Year?*
 - (a) ₹72.28*
 - (b) ₹67.55*
 - (c) ₹50.67*
 - (d) ₹77.34*

- (iv) Determine the Present Value of Market Price of shares at the end of 4th Year?
- (a) ₹49.18
 - (b) ₹32.22
 - (c) ₹45.79
 - (d) ₹42.96
- (v) Calculate today's market price of the share.
- (a) ₹59.03
 - (b) ₹54.33
 - (c) ₹57.01
 - (d) ₹57.54

ANSWERS/SOLUTIONS

Answers to the MCQs

- | | | | | | | | | | | | |
|----|-----|----|-----|----|-----|-----|-----|-----|-----|----|-----|
| 1. | (d) | 2. | (c) | 3. | (c) | 4. | (c) | 5. | (a) | 6. | (b) |
| 7. | (c) | 8. | (a) | 9. | (a) | 10. | (a) | 11. | (c) | | |

Answers to Theoretical Questions

1. Please refer paragraph 1,2 and 6
2. Please refer paragraph 3
3. Please refer paragraph 7
4. Please refer paragraph 8.1
5. Please refer paragraph 9

Answers to Practical Problems

1. Given,

Cost of Equity (K_e)	10%
Number of shares in the beginning (n)	25,000
Current Market Price (P_0)	₹ 100
Net Profit (E)	₹ 2,50,000
Expected Dividend (D_1)	₹ 5 per share
Investment (I)	₹ 5,00,000
Case 1 - When dividends are paid	Case 2 - When dividends are not paid
Step 1 $P_0 = \frac{P_1 + D_1}{1 + K_e}$ $100 = \frac{P_1 + 5}{1 + 0.10}$ $P_1 = 110 - 5 = 105$	Step 1 $P_0 = \frac{P_1 + D_1}{1 + K_e}$ $100 = \frac{P_1 + 0}{1 + 0.10}$ $P_1 = 110 - 0 = 110$
Step 2 Calculation of funds required $= [\text{Total Investment} - (\text{Net profit} - \text{Dividend})]$ $= 5,00,000 - (2,50,000 - 1,25,000)$ $= 3,75,000$	Step 2 Calculation of funds required $= [\text{Total Investment} - (\text{Net profit} - \text{Dividend})]$ $= 5,00,000 - (2,50,000 - 0)$ $= 2,50,000$
Step 3 No. of shares required to be issued for balance fund $\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end}(P_1)}$ $\Delta n = \frac{3,75,000}{105}$ $= 3,571.4285$	Step 3 No. of shares required to be issued for balance fund $\text{No. of shares} = \frac{\text{Funds required}}{\text{Price at end}(P_1)}$ $\Delta n = \frac{2,50,000}{110}$ $= 2,272.73$

<p>Step 4</p> <p>Calculation of value of firm</p> $V_f = \frac{(n + \Delta n)P_1 - I + E}{(1 + k_e)}$ $V_f = \frac{\left(25,000 + \frac{3,75,000}{105}\right)105 - 5,00,000 + 2,50,000}{(1 + .10)}$ $= ₹ 25,00,000$	<p>Step 4</p> <p>Calculation of value of firm</p> $V_f = \frac{(n + \Delta n)P_1 - I + E}{(1 + k_e)}$ $V_f = \frac{\left(25,000 + \frac{2,50,000}{110}\right)110 - 5,00,000 + 2,50,000}{(1 + 0.10)}$ $= ₹ 25,00,000$
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2. (i) The EPS of the firm is ₹ 10 (i.e., ₹ 2,00,000/ 20,000), $r = ₹ 2,00,000 / (20,000 \text{ shares} \times ₹ 100) = 10\%$. The P/E Ratio is given at 12.5 and the cost of capital (K_e) may be taken at the inverse of P/E ratio. Therefore, K_e is 8 (i.e., $1/12.5$). The firm is distributing total dividends of ₹ 1,50,000 among 20,000 shares, giving a dividend per share of ₹ 7.50. the value of the share as per Walter's model may be found as follows:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.08}(10 - 7.5)}{0.08} = ₹ 132.81$$

The firm has a dividend payout of 75% (i.e., ₹ 1,50,000) out of total earnings of ₹ 2,00,000. Since, the rate of return of the firm (r) is 10% and it is more than the K_e of 8%, therefore, by distributing 75% of earnings, the firm is not following an optimal dividend policy. The optimal dividend policy for the firm would be to pay zero dividend and in such a situation, the market price would be:

$$= \frac{0 + \frac{0.1}{0.08}(10 - 0)}{0.08} = ₹ 156.25$$

So, theoretically the market price of the share can be increased by adopting a zero payout.

- (ii) The P/E ratio at which the dividend policy will have no effect on the value of the share is such at which the K_e would be equal to the rate of return

(r) of the firm. The K_e would be 10% (= r) at the P/E ratio of 10. Therefore, at the P/E ratio of 10, the dividend policy would have no effect on the value of the share.

- (iii) If the P/E is 8 instead of 12.5, then the K_e which is the inverse of P/E ratio, would be 12.5 and in such a situation $k_e > r$ and the market price, as per Walter's model would be:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.125}(10 - 7.5)}{0.125} = ₹ 76$$

3. Market price per share by

(i) Walter's model

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{6 + \frac{0.25}{0.20}(10 - 6)}{0.20} = ₹ 55$$

(ii) Gordon's model

$$\text{Present market price per share } (P_0) = \frac{E(1 - b)}{k - br}$$

$$\begin{aligned} P_0 &= \frac{10(1 - 0.40)}{0.20 - (0.4 \times 0.25)} \\ &= \frac{6}{0.1} = ₹ 60 \end{aligned}$$

4. Price per share according to Gordon's Model is calculated as follows:

Particulars	Amount in ₹
Net Profit	50 lakhs
Less: Preference dividend	15 lakhs
Earnings for equity shareholders	35 lakhs
Earnings per share	35 lakhs/5 lakhs = ₹ 7.00

Price per share according to Gordon's Model is calculated as follows:

$$P_0 = \frac{E_1(1 - b)}{K_e - br}$$

Here, $E_1 = 7$, $K_e = 16\%$

(i) When dividend pay-out is 25%

$$P_0 = \frac{7 \times 0.25}{0.16 - (0.75 \times 0.2)} = \frac{1.75}{0.16 - 0.15} = ₹ 175$$

(ii) When dividend pay-out is 50%

$$P_0 = \frac{7 \times 0.5}{0.16 - (0.5 \times 0.2)} = \frac{3.5}{0.16 - 0.10} = ₹ 58.33$$

(iii) When dividend pay-out is 100%

$$P_0 = \frac{7 \times 1}{0.16 - (0 \times 0.2)} = \frac{7}{0.16} = ₹ 43.75$$

5. As per Dividend discount model, the price of share is calculated as follows:

$$P = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_4}{(1+K_e)^4} + \frac{D_5}{(K_e - g)} \times \frac{1}{(1+K_e)^4}$$

Where,

P = Price per share

K_e = Required rate of return on equity

g = Growth rate

$$P = \frac{₹120 \times 1.15}{(1+0.2)^1} + \frac{₹138 \times 1.15}{(1+0.2)^2} + \frac{₹158.7 \times 1.15}{(1+0.2)^3} + \frac{₹182.5 \times 1.15}{(1+0.2)^4} + \frac{₹209.88 \times 1.05}{(0.2 - 0.05)^1} \times \frac{1}{(1+0.2)^4}$$

$$P = 115 + 110.2 + 105.6 + 101.2 + 708.51 = ₹ 1,140.51$$

Intrinsic value of share is ₹ 1,140.51 as compared to latest market price of ₹ 3,122. Market price of a share is overpriced by ₹ 1,981.49.

6. (i) According to Dividend Discount Model approach, the firm's expected or required return on equity is computed as follows:

$$K_e = \frac{D_1}{P_0} + g$$

$$K_e = \frac{20(1+0.075)}{1,460} + 7.5\%$$

$$= 0.0147 + 0.075 = 0.0897 \text{ or } 8.97\%$$

- (ii) With rate of return on retained earnings (r) is 10% and retention ratio (b) is 60%, new growth rate will be as follows:

$$g = br = 0.10 \times 0.60 = 0.06$$

Accordingly, dividend will also get changed and to calculate this, first we shall calculate previous retention ratio (b_1) and then EPS assuming that rate of return on retained earnings (r) is same.

With previous Growth Rate of 7.5% and $r = 10\%$, the retention ratio comes out to be:

$$0.075 = b_1 \times 0.10$$

$$b_1 = 0.75 \text{ and payout ratio} = 0.25$$

With 0.25 payout ratio the EPS will be as follows:

$$\frac{\text{₹ } 20}{0.25} = \text{₹ } 80$$

With new 0.40 ($1 - 0.60$) payout ratio, the new dividend will be

$$D_1 = \text{₹ } 80 \times 0.40 = \text{₹ } 32$$

Accordingly, new K_e will be

$$K_e = \frac{32}{1,460} + 6.0\%$$

$$\text{or, } K_e = 8.19\%$$

7. (i) **Calculation of market price per share**

According to Miller – Modigliani (MM) Approach:

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

Where,

$$\text{Existing market price (} P_0 \text{)} = \text{₹ } 150$$

$$\text{Expected dividend per share (} D_1 \text{)} = \text{₹ } 8$$

$$\text{Capitalization rate (} k_e \text{)} = 0.10$$

$$\text{Market price at year end (} P_1 \text{)} = \text{to be determined}$$

(a) If expected dividends are declared, then

$$₹ 150 = \frac{P_1 + ₹ 8}{1 + 0.10}$$

$$\therefore P_1 = ₹ 157$$

(b) If expected dividends are not declared, then

$$₹ 150 = \frac{P_1 + 0}{1 + 0.10}$$

$$\therefore P_1 = ₹ 165$$

(ii) Calculation of number of shares to be issued

	(a) Dividends are declared (₹ lakh)	(b) Dividends are not Declared (₹ lakh)
Net income	300	300
Total dividends	(80)	-
Retained earnings	220	300
Investment budget	600	600
Amount to be raised by new issues	380	300
Relevant market price (₹ per share)	157	165
No. of new shares to be issued (in lakh)(₹ 380 ÷ 157; ₹ 300 ÷ 165)	2.42	1.82

(iii) Calculation of market value of the shares

	(a) Dividends are declared	(b) Dividends are not Declared
Existing shares (in lakhs)	10.00	10.00
New shares (in lakhs)	2.42	1.82
Total shares (in lakhs)	12.42	11.82
Market price per share (₹)	157	165

Total market value of shares at the end of the year (₹ in lakh)	12.42×157 = 1,950 (approx.)	11.82×165 = 1,950 (approx.)
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Hence, it is proved that the total market value of shares remains unchanged irrespective of whether dividends are declared, or not declared.

8. Ex-dividend price is ₹ 40 (50-10).

The total amount of dividend received is ₹ 10,00,000 which is re-invested at the rate of ₹ 40 per share.

Hence additional shares purchased would be 25,000.

Total holding would be 1,25,000 shares (1,00,000 + 25,000)

9. Current Market price = $20 \times 25 = 500$ per share

Book value of the company before repurchase = ₹ 4 cr (400x1 lakh shares)

Amount paid for repurchase = 1.25 cr (25,000 shares x 500 per share)

Book Value of company after repurchase = ₹ 2.75 cr (4cr – 1.25cr)

No of shares after repurchase = 75,000 shares

Book value per share = 367 per share.

Answers to the Case Scenarios

i.	(d)	ii.	(b)	iii.	(a)	iv.	(c)	v.	(b)
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1. **As per Dividend discount model, the price of share is calculated as follows:**

$P = \text{Sum of PV of Expected Dividends} + \text{PV of Share Price at the end of the period}$

$$P = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_4}{(1+K_e)^4} + \frac{D_5}{(K_e-g)} \times \frac{1}{(1+K_e)^4}$$

Where,

P = Price per share

K_e = Required rate of return on equity

g = Growth rate

Year	$D_1 = D_0(1+g)$	PV Discount Factor @ 12%	PV in ₹
1	$2(1+14\%) = 2.28$	0.893	2.0364
2	$2.28(1+14\%) = 2.5992$	0.797	2.0715
3	$2.5992(1+14\%) = 2.9631$	0.712	2.1097
4	$2.9631(1+14\%) = \mathbf{3.3779}$	0.636	2.1483
Total PV of Expected Dividend			₹ 8.3655

$$P_4 = \frac{D_5}{K_e - g} = \frac{D_4(1+g)}{K_e - g} = \frac{3.3779(1+7\%)}{12\% - 7\%} = ₹ 72.28$$

PV of share at the end of 4th Year = ₹ 72.28 × 0.636 = ₹ **45.97**

Market Price of shares = ₹ 8.3655 + ₹ 45.97 = ₹ **54.33**

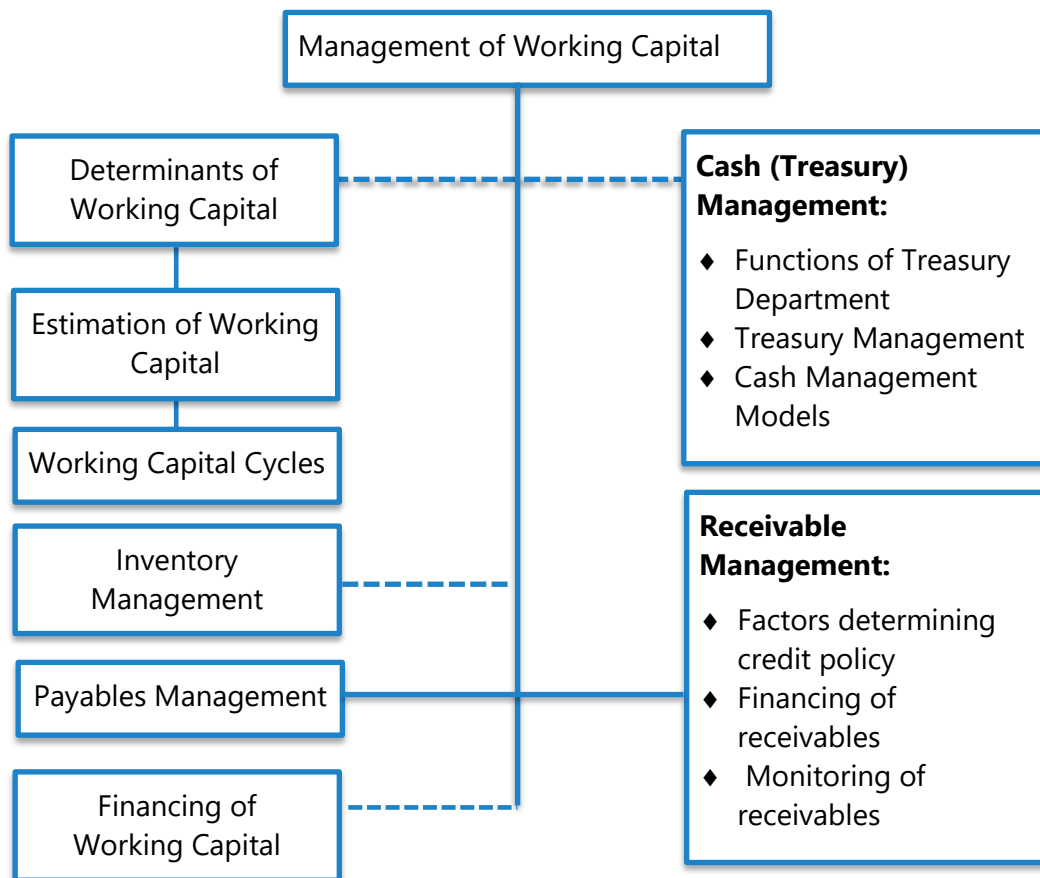
MANAGEMENT OF WORKING CAPITAL



LEARNING OUTCOMES

- ◆ Understanding the meaning, need and importance of working capital for smooth functioning of an entity.
- ◆ Understanding the factors which determine the working capital.
- ◆ Learning the methods of estimating working capital.
- ◆ Understanding the various components of working capital with its management.
- ◆ Understanding methods of receivable management.
- ◆ Learning the methods of evaluating receivables and implementation of credit policy.
- ◆ Learning the importance and management of treasury (cash) in an entity.
- ◆ Learning the various sources of working capital finance.
- ◆ Learning the importance of optimal inventory level and management of payables.

CHAPTER OVERVIEW



This chapter is Divided into Six Units:

UNIT I: Introduction to Working Capital Management

UNIT II: Treasury and Cash Management

UNIT III: Management of Inventory

UNIT IV: Management of Receivables

UNIT V: Management of Payables

UNIT VI: Financing of Working Capital

UNIT - I

INTRODUCTION TO WORKING CAPITAL MANAGEMENT

1. MEANING AND CONCEPT OF WORKING CAPITAL

In accounting terms, working capital is defined as the difference between current assets and current liabilities. If we break down the components of working capital, we will find working capital as follows:

$$\text{Working Capital} = \text{Current Assets} - \text{Current Liabilities}$$

Current Assets: An asset is classified as current when:

- (i) It is expected to be realised or intends to be sold or consumed in normal operating cycle of the entity or within twelve months after the reporting period whichever is longer; and
- (ii) The asset is held primarily for the purpose of trading in the ordinary course of business.

For the purpose of working capital management, current assets of an entity can be grouped into the following categories:

- (a) Inventory (raw material, work in process and finished goods)
- (b) Receivables (trade receivables and bills receivables)
- (c) Cash or cash equivalents (including short-term marketable securities)
- (d) Prepaid expenses

Other current assets may also include short term loans or advances, any other accrued revenue etc.

Current Liabilities: A liability is classified as current when:

- (i) It is expected to be settled in normal operating cycle of the entity or within twelve months after the reporting period whichever is longer; and

- (ii) It is settled either by the use of current assets or by creation of new current liability.

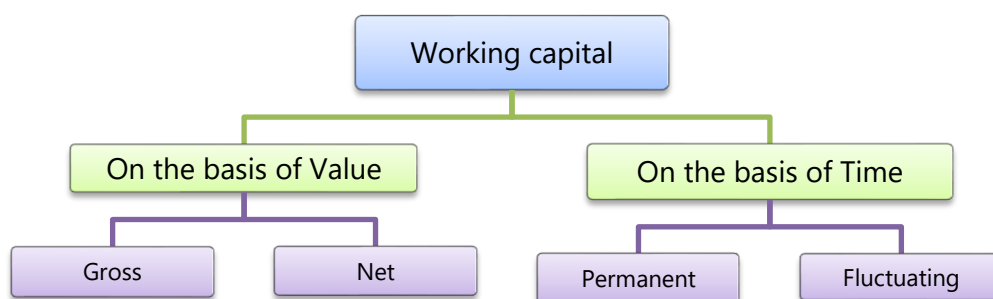
For the purpose of working capital management, current liabilities of an entity can be grouped into the following categories:

- (a) Payable (trade payables and bills payables)
- (b) Outstanding payments (wages & salary, overheads & other expenses etc.)

Other current liabilities may also include short term borrowings, current portion of long-term debts, short term provisions that are payable within twelve months such as provision for taxes etc.

Working Capital Management is process which is designed to ensure that an organization operates efficiently by monitoring & utilizing its current assets and current liabilities to the best effect. Primary objective is to enable a company maintaining sufficient cash flows in order to meet its day-to-day operating expenses and its short-term obligations.

The concept of working capital can also be explained through two angles.



(a) Value: From the value point of view, Working Capital can be defined as Gross Working Capital or Net Working Capital.

Gross working capital refers to the firm's investment in current assets.

Net working capital refers to the difference between current assets and current liabilities.

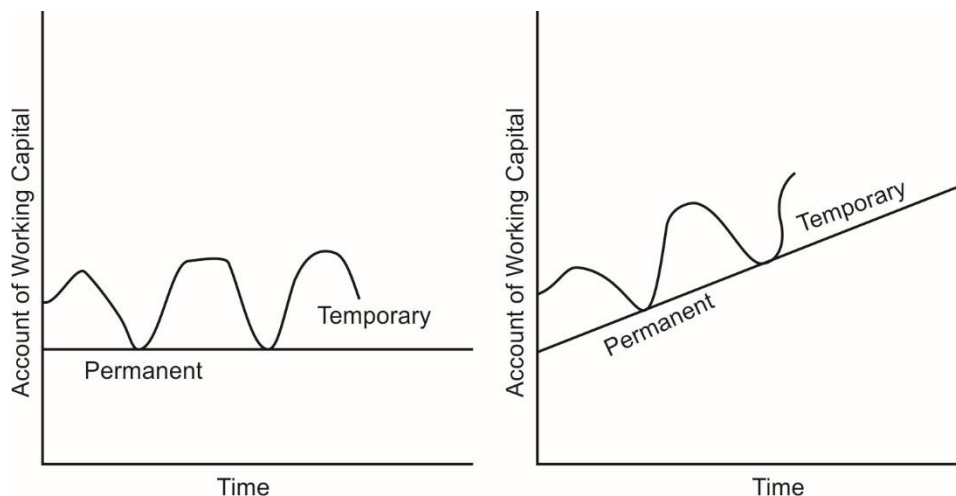
A positive working capital indicates the company's ability to pay its short-term liabilities. On the other hand, a negative working capital shows inability of an entity to meet its short-term obligations.

(b) Time: From the point of view of time, working capital can be divided into two categories viz., Permanent and Fluctuating (temporary).

Permanent working capital refers to the base working capital, which is the minimum level of investment in the current assets that is carried by the entity at all times to carry its day-to-day activities. It generally stays invested in the business, unless the operations are scaled up or down **permanently** which would also result in increase or decrease in permanent working capital. It is generally financed by long term sources of finance.

Temporary working capital refers to that part of total working capital, which is required by an entity in addition to the permanent working capital. It is also called variable or fluctuating working capital which is used to finance the short-term working capital requirements which arises due to fluctuation in sales volume. For instance, an organization would maintain increased levels of inventory to meet increased seasonal demand.

The following diagrams shows Permanent and Temporary or Fluctuating or variable working capital:



Both kinds of working capital i.e. permanent and fluctuating (temporary) are necessary to facilitate production and sales through the operating cycle.



2. SIGNIFICANCE OF WORKING CAPITAL

2.1 Importance of Adequate Working Capital

Management of working capital is an essential task of the finance manager. He has to ensure that the amount of working capital available is neither too large nor too small for its requirements.

A large amount of working capital would mean that the company has idle funds. Since funds have a cost, the company has to pay huge amount as interest on such funds that are used to invest in surplus working capital. Another way to look at it is that there is an opportunity cost involved where the company could have invested the surplus funds in long term investments and earned some return on the same.

Various studies conducted by the Bureau of Public Enterprises have shown that one of the reasons for the poor performance of public sector undertakings in our country has been the large amount of funds locked up in working capital. This results in over capitalization. Over capitalization implies that a company has too large funds for its requirements, resulting in a low rate of return, a situation which implies a less than optimal use of resources.

On the other hand, if the firm has inadequate working capital, such firm runs the risk of insolvency. Paucity of working capital may lead to a situation where the firm may not be able to meet its liabilities. It may also mean that a company may not be holding enough inventory in order to meet the customers' demand and hence would lose sales and eventually some reputation as well.

An organization, therefore, has to be very careful in estimating its working capital requirements.

Maintaining adequate working capital is not just important in the short-term, sufficient liquidity must be maintained in order to ensure the survival of the business in the long-term as well. When businesses make investment decisions, they must not only consider the financial outlay involved with acquiring the new machine or the new building, etc., but must also take account of the additional current assets that are usually required with any expansion of activity. For e.g.:

- Increased production leads to holding of additional stocks of raw materials and work-in-progress.

- An increased sale usually means that the level of debtors and the finished goods inventory requirements will increase.
- A general increase in the firm's scale of operations tends to imply a need for greater levels of working capital.

A question then arises what is an optimum amount of working capital for a firm? An organization should neither have too high an amount of working capital nor should the same be too low. It is the job of the finance manager to estimate the requirements of working capital carefully and determine the optimum level of investment in working capital.

2.2 Optimum Working Capital

If a company's current assets do not exceed its current liabilities, then it may run into trouble with creditors that want their money quickly. Not being able to meet its short-term obligations, company shall eventually lose its reputation and not many vendors would like to do business with them.

Current ratio (current assets/current liabilities) (along with acid test ratio to supplement it) has traditionally been considered the best indicator of the working capital situation.

It is understood that a current ratio of 2 (two) for a manufacturing firm implies that the firm has an optimum amount of working capital. A higher ratio may indicate inefficient use of funds and a lower ratio would mean liquidity issues as mentioned above. This is supplemented by Quick Ratio or Acid Test Ratio (Quick assets/Current liabilities) which should be at least 1 (one) which would imply that there is a comfortable liquidity position if liquid current assets are equal to current liabilities (where quick assets / liquid current assets refer to current assets less inventory & prepaid expenses).

Bankers, financial institutions, financial analysts, investors and other people interested in financial statements have, for years, considered the current ratio at 'two' and the acid test ratio at 'one' as indicators of a good working capital situation. As a thumb rule, this may be quite adequate.

However, it should be remembered that optimum working capital can be determined only with reference to the particular circumstances of a specific situation. Thus, in a company where the inventories are easily saleable and the sundry debtors are as good as liquid cash, the current ratio may be lower than 2 and yet firm may be sound or where the nature of finished goods are perishable in nature like a restaurant, then also the organization cannot afford to hold large amount of working capital. On the other hand, an organization dealing in products which take a longer production time, may need a higher amount of working capital.

In nutshell, a firm should have adequate working capital to run its business operations. Both excessive as well as inadequate working capital positions are dangerous.



3. DETERMINANTS OF WORKING CAPITAL

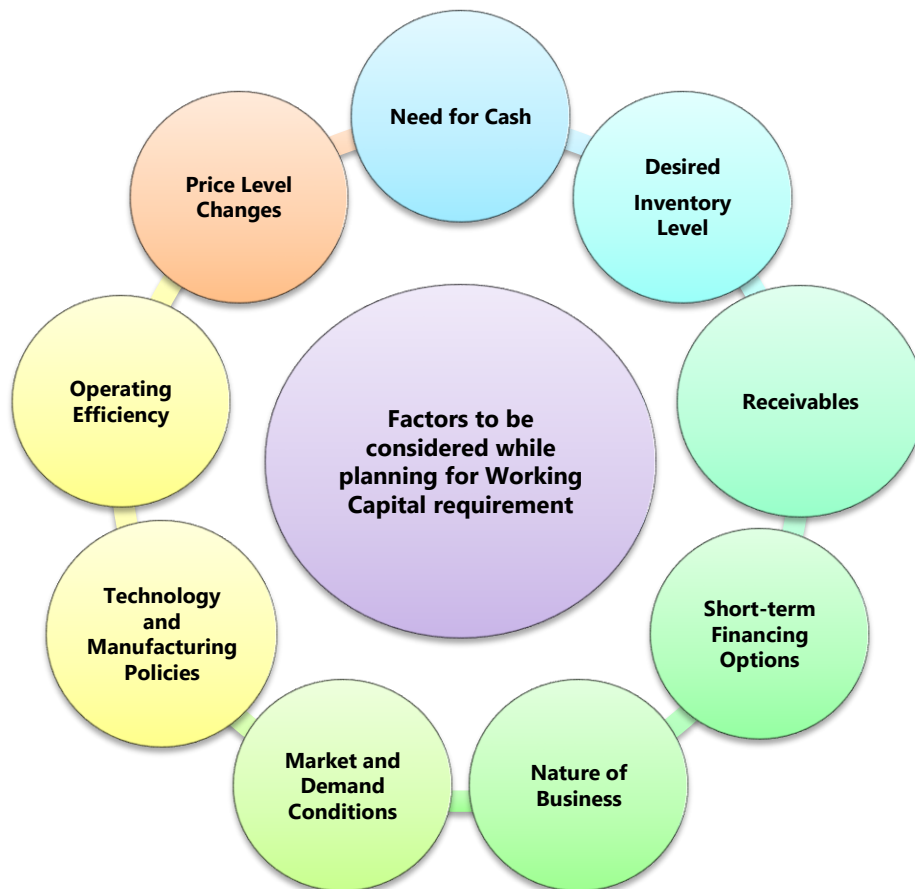
Working capital management is concerned with:

- (a) **Maintaining adequate working capital** (managing the level of individual current assets and the current liabilities) and
- (b) **Financing of the working capital.**

For the point a) above, a Finance Manager needs to plan and compute the working capital requirement for its business. And once the requirement has been computed he needs to ensure that it is financed properly. This whole exercise is known as Working Capital Management.

Sound financial and statistical techniques, supported by judgment should be used to predict the quantum of working capital required at different times.

Some of the factors which need to be considered while planning for working capital requirement are:



1. **Need for Cash:** Identify the cash balance which allows for the business to **meet day-to-day expenses** but reduces cash holding costs (example - loss of interest on long term investment had the surplus cash invested therein).
2. **Desired level of Inventory:** Identify the level of inventory which allows for uninterrupted production but reduces the investment in raw materials and hence increases cash flow. The techniques like Just in Time (JIT) and Economic order quantity (EOQ) are used for this.
3. **Receivables:** Identify the **appropriate credit policy**, i.e., credit terms which will attract customers, such that any impact on cash flows and the cash conversion cycle will be offset by increased revenue and hence Return on Capital (or vice versa). The tools like Early Payment Discounts and allowances are used for this.

4. **Short-term Financing Options:** Inventory is ideally financed by credit granted by the supplier. However, depending on the cash conversion cycle, it may be necessary to utilize a bank loan (or overdraft), or to “convert debtors to cash” through “factoring” in order to finance working capital requirements.
5. **Nature of Business:** For e.g. in a business of restaurant, most of the sales are in Cash. Therefore, need for working capital is very less. On the other hand, there would be a higher inventory in case of a pharmacy or a bookstore.
6. **Market and Demand Conditions:** For e.g. if an item’s demand far exceeds its production, the working capital requirement would be less as investment in finished goods inventory would be very less with continuous sales.
7. **Technology and Manufacturing Policies:** For e.g. in some businesses the **demand for goods is seasonal**, in that case a business may follow a policy for steady production throughout the whole year or rather may choose a policy of production only during the demand season.
8. **Operating Efficiency:** A company can reduce the working capital requirement by **eliminating waste, improving coordination, process improvements** etc.
9. **Price Level Changes & Exchange Rate Fluctuations:** For e.g. **rising prices necessitate the use of more funds** for maintaining an existing level of activity. For the same level of current assets, higher cash outlays are required. Therefore, the effect of rising prices is that a higher amount of working capital is required. Another example would be unfavorable exchange rate movement in case of imported raw materials would warrant additional cost of same.



4. MANAGEMENT OF WORKING CAPITAL

The importance of working capital for an entity can be compared to importance of life blood for a living body or of a lubricant/ fuel for an engine. Working capital is required for smooth functioning of the business of an entity as lack of this may interrupt the ordinary course of activities. Hence, the working capital needs adequate attention and efficient management. When we talk about the management, it involves **3 Es i.e. Economy, Efficiency and Effectiveness** and all these three are required for the working capital management.

The scope of working capital management can be grouped into two broad areas:

(i) Liquidity and Profitability (ii) Investment and Financing Decision.



4.1 Liquidity and Profitability

For uninterrupted and smooth functioning of the day-to-day business of an entity, it is important to maintain liquidity of funds evenly. As we have already learnt in previous chapters that each rupee of capital bears some cost. So, while maintaining liquidity the cost aspect needs to be borne in mind. Also, a higher working capital may be intended to increase the revenue & hence profitability, but at the same time unnecessary tying up of funds in idle assets not only reduces the liquidity but also reduces the opportunity to earn better return from a productive asset. Hence, a trade-off is required between the liquidity and profitability which increases the profitability without disturbing the day-to-day functioning. This requires **3Es** as discussed above i.e. **economy in financing, efficiency in utilisation** and **effectiveness in achieving** the intended objectives.

The trade-off between the components of working capital can be summarised as follows:

Component of Working Capital	Advantages of higher side (Profitability)	Trade-off (between Profitability and Liquidity)	Advantages of lower side (Liquidity)
Inventory	Fewer stock-outs increase the profitability.	Use techniques like EOQ, JIT etc. to carry optimum level of inventory.	Lower inventory requires less capital but endangered stock-out and loss of goodwill.
Receivables	Higher Credit period attract customers and increase revenue (but can result in more bad debts)	Evaluate the credit policy; use the services of debt management (factoring) agencies.	Cash sales provide liquidity but fails to boost sales and revenue (due to lower credit period)

Pre-payment of expenses	Reduces uncertainty and profitable in inflationary environment.	Cost-benefit analysis required	Improves or maintains liquidity.
Cash and Cash equivalents	Payables are honoured in time, improves the goodwill and helpful in getting future discounts.	Cash budgets and other cash management techniques can be used	Cash can be invested in some other investment avenues
Payables and Expenses	Capital can be used in some other investment avenues	Evaluate the credit policy and related cost.	Payables are honoured in time, improves the goodwill and helpful in getting future discounts.

4.2 Investment and Financing

Working capital policy is a function of two decisions, first is investment in working capital and the second is financing of the investment. Investment in working capital is concerned with the level of investment in the current assets. It gives the answer of 'How much' fund to be tied in to achieve the organisation objectives (i.e. Effectiveness of fund). Financing decision concerned with the arrangement of funds to finance the working capital. It gives the answer 'Where from' fund to be sourced at lowest cost as possible (i.e. Economy). Financing decision, we will discuss this in later unit of this chapter.

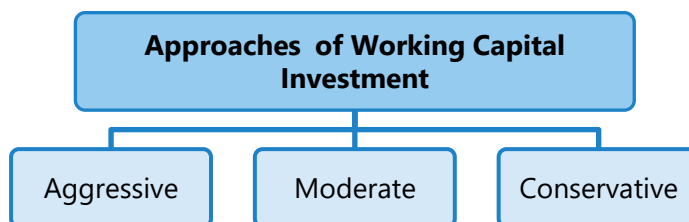
Investment of working capital: How much to be invested in current assets as working capital is a matter of policy decision by an entity. It has to be decided in the light of organisational objectives, trade policies and financial (cost-benefit) considerations. There are not set or fixed rules for deciding the level of investment in working capital. Some organisations due to its peculiarity require more investment than others. For example, an infrastructure development company requires more investment in its working capital as there may be huge inventory in the form of work in process on the other hand a company which is engaged in fast

food business, comparatively requires less investment as inventory is of perishable nature & most sales are cash sales. Hence, level of investment depends on the various factors listed below:

- (a) **Nature of Industry:** Construction companies, breweries etc. requires large investment in working capital due long gestation period.
- (b) **Types of products:** Consumer durable has large inventory as compared to perishable products.
- (c) **Manufacturing Vs Trading Vs Service:** A manufacturing entity has to maintain three levels of inventory i.e. raw material, work-in-process and finished goods whereas a trading and a service entity has to maintain inventory only in the form of trading stock and consumables respectively.
- (d) **Volume of sales:** Where the sales are high, there is a possibility of high receivables as well.
- (e) **Credit policy:** An entity whose credit policy is liberal has not only high level of receivables but may require more capital to fund raw material purchases as that will depend on credit period allowed by suppliers.

4.3 Approaches of working capital investment

Based on the organisational policy and risk-return trade off, working capital investment decisions are categorised into three approaches i.e. aggressive, conservative and moderate.

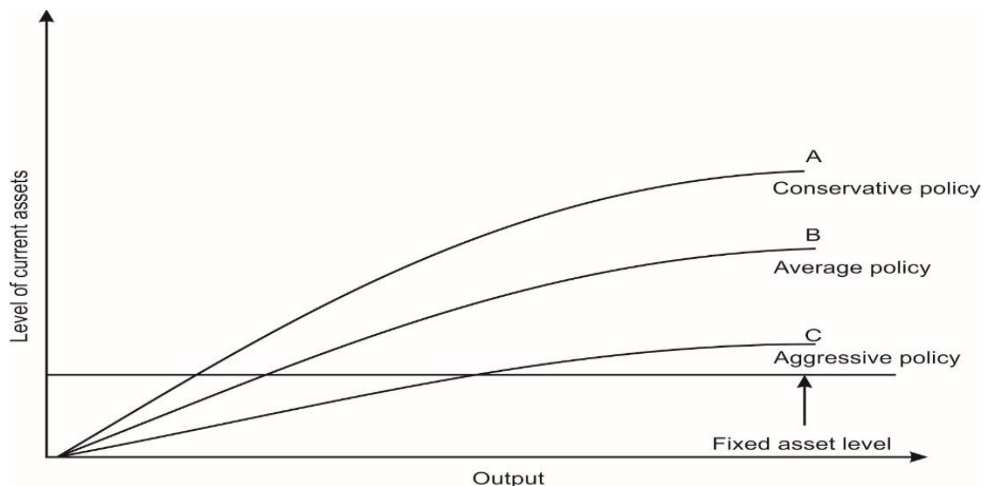


- (a) **Aggressive:** Here investment in working capital is kept at minimal investment in current assets which means the entity does hold lower level of inventory, follow strict credit policy, keeps less cash balance etc. The advantage of this approach is that lower level of fund is tied in the working capital which results in lower financial costs but the flip side could be risk of stock-outs & that the organisation could not grow which leads to lower utilisation of fixed assets and long-term debts. In the

long run firm may stay behind the competitors. This approach would better suit a highly integrated organisation with efficient processes.

(b) Conservative: In this approach, organisation choose to invest high capital in current assets. Organisations use to keep inventory level higher, follows liberal credit policies, and cash balance as high as to meet any current liabilities immediately. The advantages of this approach are higher sales volume, increased demand due to liberal credit policy and increase goodwill among the suppliers due to payment in short time. The disadvantages are increased cost of capital, inventory obsolescence, higher risk of bad debts, shortage of liquidity in long run due to longer operating cycles.

(c) Moderate: This approach is in between the above two approaches. Under this approach a balance between the risk and return is maintained to gain more by using the funds in very efficient manner.



A conservative policy implies greater liquidity and lower risk whereas an aggressive policy indicates higher risk and poor liquidity. Moderate current assets policy will fall in the middle of conservative and aggressive policies which most of the firms follow to strike an appropriate balance as per the requirements of their trade or industry. Also, an organization may follow a different policy at different times as may be needed depending on determinants of working capital as discussed earlier.

4.4 Current Assets to Fixed Assets Ratio

The finance manager is required to determine the optimum level of current assets so that the shareholders' value is maximized.

A firm needs both fixed and current assets to support a particular level of output.

As the firm's output and sales increases, the need for current assets also increases. Generally, current assets do not increase in direct proportion to output; current assets may increase at a decreasing rate with output. As the output increases, the firm starts using its current asset more efficiently.

The level of the current assets can be measured by creating a relationship between current assets and fixed assets. Dividing current assets by fixed assets gives current assets/fixed assets ratio.

Assuming a constant level of fixed assets, a higher current assets/fixed assets ratio indicates a conservative current assets policy and a lower current assets/fixed assets ratio means an aggressive current assets policy assuming all other factors to be constant.

The following illustration explains the risk-return trade off of various working capital management policies, viz., conservative, aggressive and moderate.

ILLUSTRATION 1

A firm has the following data for the year ending 31st March, 2022:

	(₹)
Sales (1,00,000 @ ₹ 20)	20,00,000
Earnings before Interest and Taxes	2,00,000
Fixed Assets	5,00,000

The three possible current assets holdings of the firm are ₹ 5,00,000, ₹ 4,00,000 and ₹ 3,00,000. It is assumed that fixed assets level is constant, and profits do not vary with current assets levels. ANALYSE the effect of the three alternative current assets policies.

SOLUTION**Effect of Alternative Current Assets Policies**

	Conservative (₹)	Moderate (₹)	Aggressive (₹)
Sales	20,00,000	20,00,000	20,00,000
Earnings before Interest and Taxes (EBIT)	2,00,000	2,00,000	2,00,000
Current Assets	5,00,000	4,00,000	3,00,000
Fixed Assets	5,00,000	5,00,000	5,00,000
Total Assets	10,00,000	9,00,000	8,00,000
Return on Total Assets (EBIT ÷ Total Assets)	20%	22.22%	25%
Current Assets/Fixed Assets	1.00	0.80	0.60

The aforesaid calculation shows that the conservative policy provides greater liquidity (solvency) to the firm, but lower return on total assets. On the other hand, the aggressive policy gives higher return, but low liquidity and thus is very risky. The moderate policy generates return higher than Conservative policy but lower than aggressive policy. This is less risky than aggressive policy but riskier than conservative policy. It also reflects inverse relationship between Current Assets / Fixed Assets ratio and Return on Total Assets.

In determining the optimum level of current assets, the firm should balance the profitability – solvency tangle by minimizing total costs – Cost of liquidity and cost of illiquidity.

5. ESTIMATING WORKING CAPITAL NEEDS

Operating cycle is one of the most reliable methods of Computation of Working Capital.

However, other methods like ratio of sales and ratio of fixed investment may also be used to determine the Working Capital requirements. These methods are briefly explained as follows:

- (i) **Current Assets Holding Period:** To estimate working capital needs based on the average holding period of current assets and relating them to costs based on the company's experience in the previous year. This method is essentially based on the Operating Cycle Concept.
- (ii) **Ratio of Sales:** To estimate working capital needs as a ratio of sales on the assumption that current assets change with changes in sales.
- (iii) **Ratio of Fixed Investments:** To estimate Working Capital requirements as a percentage of fixed investments.

A number of factors will, however, be impacting the choice of method of estimating Working Capital. Factors such as seasonal fluctuations, accurate sales forecast, investment cost and variability in sales price would generally be considered. The production cycle and credit and collection policies of the firm will have an impact on Working Capital requirements. Therefore, they should be given due weightage in projecting Working Capital requirements.

6. OPERATING OR WORKING CAPITAL CYCLE

A useful tool for managing working capital is the operating cycle.

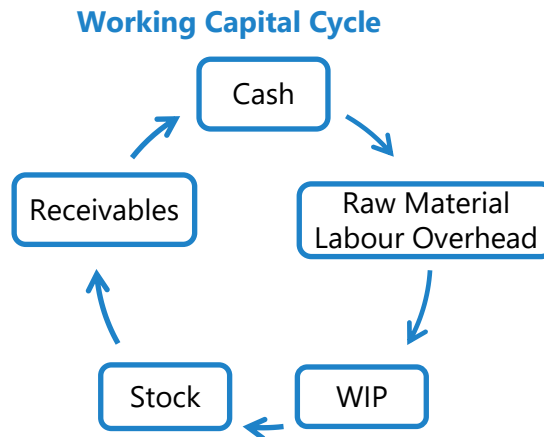
The operating cycle analyses the accounts receivable, inventory and accounts payable cycles in terms of number of days. For example:

- Accounts receivables are analyzed by the average number of days it takes to collect an account.
- Inventory is analyzed by the average number of days it takes to turn over the sale of a product (from the point it comes in the store to the point it is converted to cash or an account receivable).
- Accounts payables are analyzed by the average number of days it takes to pay a supplier invoice.

Operating/Working Capital Cycle Definition

Working Capital cycle indicates the length of time between a company's paying for materials, entering into stock and receiving the cash from sales of finished goods. It can be determined by adding the number of days required for each stage in the

cycle. For example, a company holds raw materials on an average for 60 days, it gets credit from the supplier for 15 days, production process needs 15 days, finished goods are held for 30 days and 30 days credit is extended to debtors. The total of all these, 120 days, i.e., $60 - 15 + 15 + 30 + 30$ days is the total working capital cycle.



Most businesses cannot finance the operating cycle (accounts receivable days + inventory days) with accounts payable financing alone. Consequently, working capital financing is needed. This shortfall is typically covered by the net profits generated internally or by externally borrowed funds or by a combination of the two.

The faster a business expands the more cash it will need for working capital and investment. The cheapest and best sources of cash exist as working capital right within the business. Good management of working capital will generate cash which will help improve profits and reduce risks. Bear in mind that the cost of providing credit to customers and holding stocks can represent a substantial proportion of a firm's total profits.

Each component of working capital (namely inventory, receivables and payables) has two dimensions Time and Money. When it comes to managing working capital then time is money. If you can get money to move faster around the cycle (e.g. collect amount due from debtors more quickly) or reduce the amount of money tied up (e.g. reduce inventory levels relative to sales), the business will generate more cash or it will need to borrow less money to fund working capital. Similarly, if you can negotiate improved terms with suppliers e.g. get longer credit or an

increased credit limit; you are effectively creating free finance to help fund future sales.

If you.....	Then
Collect receivables (debtors) faster	You release cash from the cycle
Collect receivables (debtors) slower	Your receivables soak up cash.
Get better credit (in terms of duration or amount) from suppliers.	You increase your cash resources.
Shift inventory (stocks) faster	You free up cash.
Move inventory (stocks) slower	You consume more cash.

The determination of operating capital cycle helps in the forecasting, controlling and management of working capital. The length of operating cycle is the indicator of performance of management. The net operating cycle represents the time interval for which the firm has to negotiate for Working Capital from its lenders. It enables to determine accurately the amount of working capital needed for the continuous operation of business activities.

The duration of working capital cycle may vary depending on the nature of the business.

In the form of an equation, the operating cycle process can be expressed as follows:

$$\text{Operating Cycle} = R + W + F + D - C$$

Where,

R = Raw material storage period

W = Work-in-progress inventory* holding period

F = Finished goods storage period

D = Receivables (Debtors) collection period

C = Credit period allowed by suppliers (Creditors)

* work in progress inventory may also be termed as works cost.

Also,

Number of Operating Cycles in a Year = 360 or 365 / Operating Cycle

Wherein, more the number of operating cycles better it is for the organization as it indicates shorter operating cycle.

The various components of Operating Cycle may be calculated as shown below:

(1)	Raw Material Storage Period	$= \frac{\text{Average stock of raw material}}{\text{Average Cost of Raw Material Consumption per day}}$
(2)	Work-in-Progress inventory holding period	$= \frac{\text{Average Work-in-progress inventory}}{\text{Average Cost of Production per day}}$
(3)	Finished Goods storage period	$= \frac{\text{Average stock of finished goods}}{\text{Average Cost of Goods Sold per day}}$
(4)	Receivables (Debtors) collection period	$= \frac{\text{Average Receivables}}{\text{Average Credit Sales per day}}$
(5)	Credit period allowed by suppliers (Creditors)	$= \frac{\text{Average Payables}}{\text{Average Credit Purchases per day}}$

6.1 Working Capital Based on Operating Cycle

One of the methods for forecasting working capital requirement is based on the concept of operating cycle. The calculation of operating cycle and the formula for estimating working capital on its basis has been demonstrated with the help of following illustration:

ILLUSTRATION 2

From the following information of XYZ Ltd., you are required to CALCULATE:

- Net operating cycle period.*
- Number of operating cycles in a year.*

	(₹)
(i) Raw material inventory consumed during the year	6,00,000
(ii) Average stock of raw material	50,000
(iii) Cost of Production for the year	5,00,000
(iv) Average work-in-progress inventory	30,000
(v) Cost of goods sold during the year	8,00,000
(vi) Average finished goods stock held	40,000
(vii) Average collection period from debtors	45 days
(viii) Average credit period availed	30 days
(ix) No. of days in a year	360 days

SOLUTION**(a) Calculation of Net Operating Cycle period of XYZ Ltd.**

Raw Material storage period (R)=

$$\begin{aligned}
 & \frac{\text{Average stock of raw material}}{\text{Average Cost of Raw Material Consumption per day}} \\
 &= \frac{₹ 50,000}{₹ 6,00,000 \div 360 \text{ days}} = \frac{₹ 50,000}{1,667} = 30 \text{ days}
 \end{aligned}$$

Work-in-progress inventory holding period (W)

$$\begin{aligned}
 &= \frac{\text{Average Work-in-progress inventory}}{\text{Average Cost of Production per day}} \\
 &= \frac{₹ 30,000}{₹ 5,00,000 \div 360 \text{ days}} = \frac{₹ 30,000}{1,389} = 22 \text{ days}
 \end{aligned}$$

Finished Goods storage period (F)

$$= \frac{\text{Average stock of finished goods}}{\text{Average Cost of Goods Sold per day}}$$

$$= \frac{₹40,000}{₹8,00,000 \div 360 \text{ days}} = \frac{₹40,000}{2,222} = 18 \text{ days}$$

Receivables (Debtors) collection period (D) = 45 days

Credit Period allowed by creditors (C) = 30 days

Net Operating Cycle = R + W + F + D – C = 30 + 22 + 18 + 45 – 30 = 85 days

(b) Number of Operating Cycles in a year = $\frac{\text{No. of days in a year}}{\text{Operating Cycle period}}$

$$= \frac{360 \text{ days}}{85 \text{ days}} = 4.23 \text{ times}$$

6.2 Estimation of amount of Different Components of Current Assets and Current Liabilities

The various constituents of current assets and current liabilities have a direct bearing on the computation of working capital and the operating cycle. The holding period of various constituents of Current Assets and Current Liabilities cycle may either contract or expand the net operating cycle period.

Shorter the operating cycle period, lower will be the requirement of working capital and *vice-versa*.

Estimation of Current Assets

The estimates of various components of gross working capital or current assets may be made as follows:

(i) Raw Materials Inventory: The funds to be invested in raw materials inventory may be estimated on the basis of production budget, the estimated cost per unit and average holding period of raw material inventory by using the following formula:

$$\frac{\text{Estimated Production (units)}}{12\text{months}/365\text{days}^*} \times \text{Estimated cost per unit} \times \text{Average raw material storage period}$$

(ii) Work-in-Progress Inventory: The funds to be invested in work-in-progress can be estimated by the following formula:

$$\frac{\text{Estimated Production(units)}}{12\text{months}/365\text{days}^*} \times \text{Estimated WIP cost per unit} \times \text{Average WIP holding period}$$

(iii) Finished Goods: The funds to be invested in finished goods inventory can be estimated with the help of following formula:

$$\frac{\text{Estimated Production(units)}}{12\text{months}/365\text{days}^*} \times \text{Estimated cost of production per unit} \times \text{Average finished goods storage period}$$

(iv) Receivables (Debtors): Funds to be invested in trade receivables (debtors) may be estimated with the help of following formula:

$$\frac{\text{Estimated Credit sales (units)}}{12\text{months}/365\text{days}^*} \times \text{Estimated cost of sales (Excl. Dep.) per unit} \times \text{Average receivable collection period.}$$

Note that only cash cost is considered for debtors and finished goods elements (as the sales to debtors include cost & profit whereas the funds required for working capital purposes doesn't need to include profit). Further, non-cash expense like depreciation is also excluded.

(v) Cash and Cash equivalents: Minimum desired Cash and Bank balance to be maintained by the firm has to be added in the current assets for the computation of working capital.

Estimation of Current Liabilities

Current liabilities are deducted from the current assets to get working capital. Hence, the amount of working capital is lowered to the extent of current liabilities (other than bank credit) arising in the normal course of business. The important current liabilities like trade payables, wages and overheads can be estimated as follows:

(i) Trade Payables: Trade payable can be estimated on the basis of material purchase budget and the credit purchase by using following formula:

$$\frac{\text{Estimated credit purchase}}{12\text{months}/365\text{days}^*} \times \text{Credit period allowed by suppliers}$$

(ii) **Direct Wages:** It is estimated with the help of direct wages budget by using following formula:

$$\frac{\text{Estimated labour hours} \times \text{wages rate per hour}}{12\text{months}/365\text{days}^*} \times \text{Average time lag in payment of wages}$$

(iii) **Overheads (other than depreciation and amortization):** It may be estimated with the help of following formula:

$$\frac{\text{Estimated Overheads}}{12\text{months}/360\text{days}^*} \times \text{Average time lag in payment of overheads}$$

**Number of days in a year may be taken as 365 or 360 days.*

Estimation of Working Capital Requirements

		Amount (₹)	Amount (₹)	Amount (₹)
I.	Current Assets:			
	Inventories:			
	-Raw Materials	---		
	-Work-in-process	---		
	-Finished goods	---	---	
	Receivables:			
	-Trade debtors	---		
	-Bills	---	---	
	Prepaid Expenses		---	
	Minimum Cash Balance		---	
	Gross Working Capital		---	---
II.	Current Liabilities:			
	Trade Payables		---	

	Bills Payables		---	
	Wages Payables		---	
	Payables for overheads		---	---
III.	Excess of Current Assets over Current Liabilities [I – II]			---
IV.	Safety Margin			---
V.	Net Working Capital [III + IV]			---

The following illustration shows the process of working capital estimation:

ILLUSTRATION 3

On 1st January, the Managing Director of Naureen Ltd. wishes to know the amount of working capital that will be required during the year. From the following information, PREPARE the working capital requirements forecast.

Production during the previous year was 60,000 units. It is planned that this level of activity would be maintained during the present year.

The expected ratios of the cost to selling prices are Raw materials 60%, Direct wages 10% and Overheads 20%.

Raw materials are expected to remain in store for an average of 2 months before issue to production.

Each unit is expected to be in process for one month, the raw materials being fed into the pipeline immediately and the labour and overhead costs accruing evenly during the month.

Finished goods will stay in the warehouse awaiting dispatch to customers for approximately 3 months.

Credit allowed by creditors is 2 months from the date of delivery of raw material.

Credit allowed to debtors is 3 months from the date of dispatch.

Selling price is ₹5 per unit.

There is a regular production and sales cycle.

Wages and overheads are paid on the 1st of each month for the previous month.

The company normally keeps cash in hand to the extent of ₹20,000.

SOLUTION**Working Notes:**

1. **Raw material inventory:** The cost of materials for the whole year is 60% of the Sales value.

Hence it is $60,000 \text{ units} \times ₹ 5 \times \frac{60}{100} = ₹ 1,80,000$. The monthly consumption of raw material would be ₹ 15,000. Raw material requirements would be for two months; hence raw materials in stock would be ₹ 30,000.

2. **Work-in-process:** (Students may give special attention to this point). It is stated that each unit of production is expected to be in process for one month).

		(₹)
(a)	Raw materials in work-in-process (being one month's raw material requirements)	15,000
(b)	Labour costs in work-in-process (It is stated that it accrues evenly during the month. Thus, on the first day of each month it would be zero and on the last day of month the work-in-process would include one month's labour costs. On an average therefore, it would be equivalent to $\frac{1}{2}$ of the month's labour costs) $\left(\frac{10\% \text{ of } (60,000 \times ₹ 5)}{12 \text{ months}} \times 0.5 \text{ month} \right)$	1,250
(c)	Overheads (For $\frac{1}{2}$ month as explained above) $\left(\frac{20\% \text{ of } (60,000 \times ₹ 5)}{12 \text{ months}} \times 0.5 \text{ month} \right)$	2,500
	Total work-in-process	18,750

3. **Finished goods inventory:** (3 month's cost of production)

Raw materials $\left(\frac{60\% \text{ of } (60,000 \times ₹ 5)}{12 \text{ months}} \times 3 \text{ months} \right)$	45,000
---	--------

Labour $\left(\frac{10\% \text{ of } (60,000 \times ₹ 5)}{12 \text{ months}} \times 3 \text{ months} \right)$	7,500
Overheads $\left(\frac{20\% \text{ of } (60,000 \times ₹ 5)}{12 \text{ months}} \times 3 \text{ months} \right)$	15,000
Total finished goods inventory	67,500
Alternatively, $(60,000 \text{ units} \times ₹ 5 \times 90\%) \times 3/12$	67,500

4. **Debtors:** The total cost of sales = 2,70,000.

$$\text{Therefore, debtors} = ₹ 2,70,000 \times \frac{3}{12} = ₹ 67,500$$

Where, Total Cost of Sales = RM + Wages + Overheads + Opening Finished goods inventory – Closing finished goods inventory.

$$= ₹ 1,80,000 + ₹ 30,000 + ₹ 60,000 + ₹ 67,500 - ₹ 67,500 = ₹ 2,70,000.$$

5. **Creditors:** Suppliers allow a two months' credit period. Hence, the average amount of creditors would be two months consumption of raw materials i.e.

$$\left(\frac{60\% \text{ of } (60,000 \times ₹ 5)}{12 \text{ months}} \times 2 \text{ months} \right) = ₹ 30,000.$$

6. **Direct Wages payable:** $\left(\frac{10\% \text{ of } (60,000 \times ₹ 5)}{12 \text{ months}} \times 1 \text{ month} \right) = ₹ 2,500$

7. **Overheads Payable:** $\left(\frac{20\% \text{ of } (60,000 \times ₹ 5)}{12 \text{ months}} \times 1 \text{ month} \right) = ₹ 5,000$

Here it has been assumed that inventory level is uniform throughout the year, therefore opening inventory equals closing inventory.

Statement of Working Capital Required

	(₹)	(₹)
Current Assets or Gross Working Capital:		
Raw materials inventory (Refer to working note 1)	30,000	
Working-in-process (Refer to working note 2)	18,750	
Finished goods inventory (Refer to working note 3)	67,500	

Debtors (Refer to working note 4)	67,500	
Cash	20,000	2,03,750
Current Liabilities:		
Creditors (Refer to working note 5)	30,000	
Direct wages payable (Refer to working note 6)	2,500	
Overheads payable (Refer to working note 7)	5,000	(37,500)
Estimated working capital requirements		1,66,250

6.3 Working Capital Requirement Estimation based on Cash Cost

We have already seen that working capital is the difference between current assets and current liabilities. To estimate requirements of working capital, we have to forecast the amount required for each item of current assets and current liabilities.

In practice another approach may also be useful in estimating working capital requirements. This approach is based on the fact that in **the case of current assets, like sundry debtors and finished goods, etc., the exact amount of funds blocked is less than the amount of such current assets**. For example:

- If we have sundry debtors worth ₹ 1 lakh and our cost of sales is ₹ 75,000, the actual amount of funds blocked in sundry debtors is ₹ 75,000 the cost of sundry debtors, the rest (₹ 25,000) is profit.
- Again, some of the cost items also are non-cash costs; depreciation is a non-cash cost item. Suppose out of ₹ 75,000, ₹ 5,000 is depreciation; then it is obvious that the actual funds blocked in terms of sundry debtors totaling ₹ 1 lakh is only ₹ 70,000. In other words, ₹ 70,000 is the amount of funds required to finance sundry debtors worth ₹ 1 lakh.
- Similarly, in the case of finished goods which are valued at cost, non-cash costs may be excluded to work out the amount of funds blocked.

Many experts, therefore, calculate the working capital requirements by working out the **cash costs of finished goods and sundry debtors**. Under this approach, the debtors are calculated not as a percentage of sales value but as a percentage of cash costs. Similarly, finished goods are valued according to cash costs.

ILLUSTRATION 4

The following annual figures relate to XYZ Co.:

	(₹)
Sales (at two months' credit)	36,00,000
Materials consumed (suppliers extend two months' credit)	9,00,000
Wages paid (1 month lag in payment)	7,20,000
Cash manufacturing expenses (expenses are paid one month in arrear)	9,60,000
Administrative expenses (1 month lag in payment)	2,40,000
Sales promotion expenses (paid quarterly in advance)	1,20,000

The company sells its products on gross profit of 25%. Depreciation is considered as a part of the cost of production. It keeps one month's stock each of raw materials and finished goods, and a cash balance of ₹ 1,00,000.

Assuming a 20% safety margin, COMPUTE the working capital requirements of the company on cash cost basis. Ignore work-in-process.

SOLUTION**Statement of Working Capital requirements (cash cost basis)**

	(₹)	(₹)
A. Current Assets		
Inventory:		
-Raw materials $\left(\frac{₹ 9,00,000}{12 \text{ months}} \times 1 \text{ month} \right)$	75,000	
-Finished Goods $\left(\frac{₹ 25,80,000}{12 \text{ months}} \times 1 \text{ month} \right)$	2,15,000	
Receivables (Debtors) $\left(\frac{₹ 29,40,000}{12 \text{ months}} \times 2 \text{ months} \right)$	4,90,000	
Sales Promotion expenses paid in advance $\left(\frac{₹ 1,20,000}{12 \text{ months}} \times 3 \text{ months} \right)$	30,000	

Cash balance	1,00,000	9,10,000
Gross Working Capital		9,10,000
B. Current Liabilities:		
Payables:		
-Creditors for materials $\left(\frac{₹ 9,00,000}{12 \text{ months}} \times 2 \text{ month} \right)$	1,50,000	
Wages outstanding $\left(\frac{₹ 7,20,000}{12 \text{ months}} \times 1 \text{ month} \right)$	60,000	
Manufacturing expenses outstanding $\left(\frac{₹ 9,60,000}{12 \text{ months}} \times 1 \text{ month} \right)$	80,000	
Administrative expenses outstanding $\left(\frac{₹ 2,40,000}{12 \text{ months}} \times 1 \text{ month} \right)$	20,000	3,10,000
Net working capital (A - B)		6,00,000
Add: Safety margin @ 20%		1,20,000
Total Working Capital requirements		7,20,000

Working Notes:

(i) Computation of Annual Cash Cost of Production	(₹)
Material consumed	9,00,000
Wages	7,20,000
Manufacturing expenses	9,60,000
Total cash cost of production	25,80,000
(ii) Computation of Annual Cash Cost of Sales:	(₹)
Total Cash cost of production as in (i) above	25,80,000
Administrative Expenses	2,40,000
Sales promotion expenses	1,20,000
Total cash cost of sales	29,40,000

6.4 Effect of Double Shift Working on Working Capital Requirements

The greatest economy in introducing double shift is the greater utilization of fixed assets. Although production increases, little or very marginal funds may be required for additional assets.

But increase in the number of hours of production has an effect on the working capital requirements. Let's see the **impact of double shift** on some of the components of working capital:-

- It is obvious that in double shift working, an increase in stocks will be required as the production rises. However, it is quite possible that the increase may not be proportionate to the rise in production since the minimum level of stocks may not be very much higher. Thus, it is quite likely that the level of stocks may not be required to be doubled as the production goes up two-fold.
- The amount of materials in process will not change due to double shift working since work started in the first shift will be completed in the second; hence, capital tied up in materials in process will be the same as with single shift working. As such the cost of work-in-process will not change unless the second shift's workers are paid at a higher rate.
- Also, additional requirements of materials & other resources may result in some economies (for example better negotiation with vendors on account increased purchase of materials etc). Further all the fixed costs may not increase with additional shift.

ILLUSTRATION 5

Samreen Enterprises has been operating its manufacturing facilities till 31.3.2022 on a single shift working with the following cost structure:

	Per unit (₹)
Cost of Materials	6.00
Wages (out of which 40% fixed)	5.00
Overheads (out of which 80% fixed)	5.00
Profit	<u>2.00</u>
Selling Price	<u>18.00</u>
Sales during 2020-21 – ₹ 4,32,000	

As at 31.3.2022 the company held:

	(₹)
Stock of raw materials (at cost)	36,000
Work-in-progress (valued at prime cost)	22,000
Finished goods (valued at total cost)	72,000
Sundry debtors	1,08,000

In view of increased market demand, it is proposed to double production by working an extra shift. It is expected that a 10% discount will be available from suppliers of raw materials in view of increased volume of business. Selling price will remain the same. The credit period allowed to customers will remain unaltered. Credit availed of from suppliers will continue to remain at the present level i.e., 2 months. Lag in payment of wages and expenses will continue to remain half a month.

You are required to PREPARE the additional working capital requirements, if the policy to increase output is implemented.

SOLUTION

This question can be solved using two approaches:

- To assess the impact of double shift for long term as a matter of production policy.
- To assess the impact of double shift to mitigate the immediate demand for next year only.

The first approach is more appropriate and fulfilling the requirement of the question.

- Assessment of impact of double shift for long term as a matter of production policy:**

Comparative Statement of Working Capital Requirement

	Single Shift (24,000)			Double Shift (48,000)		
	Unit	Rate (₹)	Amount (₹)	Unit	Rate (₹)	Amount (₹)
Current Assets						
Inventories:						
Raw Materials	6,000	6.00	36,000	12,000	5.40	64,800

Work-in-Progress	2,000	11.00	22,000	2,000	9.40	18,800
Finished Goods	4,500	16.00	72,000	9,000	12.40	1,11,600
Sundry Debtors	6,000	16.00	96,000	12,000	12.40	1,48,800
Total Current Assets: (A)			2,26,000			3,44,000
Current Liabilities						
Creditors for Materials	4,000	6.00	24,000	8,000	5.40	43,200
Creditors for Wages	1,000	5.00	5,000	2,000	4.00	8,000
Creditors for Expenses	1,000	5.00	5,000	2,000	3.00	6,000
Total Current Liabilities: (B)			34,000			57,200
Working Capital: (A) – (B)			1,92,000			2,86,800

Additional Working Capital requirement = ₹ 2,86,800 – ₹ 1,92,000 = ₹ 94,800

Workings:

- (1) Statement of cost at single shift and double shift working

	24,000 units		48,000 Units	
	Per unit (₹)	Total (₹)	Per unit (₹)	Total (₹)
Raw materials	6.00	1,44,000	5.40	2,59,200
1. Wages - Variable	3.00	72,000	3.00	1,44,000
Fixed	2.00	48,000	1.00	48,000
Overheads - Variable	1.00	24,000	1.00	48,000
Fixed	4.00	96,000	2.00	96,000
Total cost	16.00	3,84,000	12.40	5,95,200
Profit	2.00	48,000	5.60	2,68,800
	18.00	4,32,000	18.00	8,64,000

- (2) Sales in units 2020-21 = $\frac{\text{Sales}}{\text{Unit selling price}} = \frac{\text{₹ } 4,32,000}{\text{₹ } 18} = 24,000 \text{ units}$
- (3) Stock of Raw Materials in units on 31.3.2021
 $= \frac{\text{Value of Stock}}{\text{Cost per unit}} = \frac{\text{₹ } 36,000}{6} = 6,000 \text{ units}$
- (4) Stock of work-in-progress in units on 31.3.2021
 $= \frac{\text{Value of work-in-progress}}{\text{Prime Cost per unit}} = \frac{\text{₹ } 22,000}{(\text{₹ } 6 + \text{₹ } 5)} = 2,000 \text{ units}$
- (5) Stock of finished goods in units 2020-21
 $= \frac{\text{Value of Stock}}{\text{Total Cost per unit}} = \frac{\text{₹ } 72,000}{\text{₹ } 16} = 4,500 \text{ units}$

(ii) Assessment of the impact of double shift to mitigate the immediate demand for next year only & not as part of policy implementation.

In this approach, working capital shall be computed as if we are calculating the same for the next / second year with double production. Whereas, in the first approach to implement double-shift as part of policy implementation, we calculated comparative analysis of working capital requirement for single & double shift within the same year.

Workings:

- (6) Calculation of no. of units to be sold:

No. of units to be Produced	48,000
Add: Opening stock of finished goods	4,500
Less: Closing stock of finished goods	(9,000)
No. of units to be Sold	43,500

- (7) Calculation of Material to be consumed and materials to be purchased in units:

No. of units Produced	48,000
Add: Closing stock of WIP	2,000
Less: Opening stock of WIP	(2,000)
Raw Materials to be consumed in units	48,000

Add: Closing stock of Raw material	12,000
Less: Opening stock of Raw material	(6,000)
Raw Materials to be purchased (in units)	54,000

(8) Credit allowed by suppliers:

$$= \frac{\text{No. of units to purchased} \times \text{Cost per unit}}{12 \text{ months}} \times 2 \text{ months}$$

$$= \frac{54,000 \times ₹ 5.40}{12 \text{ months}} \times 2 \text{ months} = ₹ 48,600$$

Comparative Statement of Working Capital Requirement

	Single Shift (Current Year – 24,000 units)			Double Shift (Next Year – 48,000 units)		
	Unit	Rate (₹)	Amount (₹)	Unit	Rate (₹)	Amount (₹)
Current Assets						
Inventories:						
Raw Materials	6,000	6.00	36,000	12,000	5.40	64,800
Work-in-Progress	2,000	11.00	22,000	2,000	9.40	18,800
Finished Goods	4,500	16.00	72,000	9,000	12.40	1,11,600
Sundry Debtors	6,000	16.00	96,000	12,000	12.40	1,48,800
Total Current Assets: (A)			2,26,000			3,44,000
Current Liabilities						
Creditors for Materials	4,000	6.00	24,000	9,000	5.40	48,600
Creditors for Wages	1,000	5.00	5,000	2,000	4.00	8,000
Creditors for Expenses	1,000	5.00	5,000	2,000	3.00	6,000
Total Current Liabilities: (B)			34,000			62,600
Working Capital: (A) – (B)			1,92,000			2,81,400

Additional Working Capital requirement = ₹ 2,81,400 – ₹ 1,92,000 = ₹ 89,400

Notes:

- (i) The quantity of material in process will not change due to double shift working since work started in the first shift will be completed in the second shift.
- (ii) It is given in the question that the WIP is valued at prime cost hence, it is assumed that the WIP is 100% complete in respect of material and labour.
- (iii) In absence of any information on proportion of credit sales to total sales, debtors quantity has been doubled for double shift. Hence, the units have been taken as 12,000 only.
- (iv) It is assumed that all purchases are on credit.
- (v) The valuation of work-in-progress based on prime cost (i.e. material & labor) as per the policy of the company is as under.

	Single shift (₹)	Double shift (₹)
Materials	6.00	5.40
Wages – Variable	3.00	3.00
Fixed	2.00	1.00
	11.00	9.40

UNIT - II

TREASURY AND CASH MANAGEMENT



7. TREASURY MANAGEMENT: MEANING

In the wake of the competitive business environment resulting from the liberalization of the economy, there is a pressure to manage cash scientifically. The demand for funds for expansions coupled with high interest rates, foreign exchange volatility and the growing volume of financial transactions have necessitated efficient management of money.

Treasury management encompasses planning, organizing & controlling the funds & working capital of an enterprise in order to ensure best use of funds, maintain liquidity, reduce overall cost of funds and mitigating operational & financial risk. It involves the corporate handling of all financial matters, the generation of external and internal funds for business, the management of currencies and cash flows and the complex, strategies, policies and procedures of corporate finance.

The treasury management mainly deals with:-

- Working capital management; and
- Financial risk management (It includes forex and interest rate management).

The key goals of treasury management are:-

- Maximize the return on the available cash;
- Minimize interest cost on borrowings;
- Mobilise as much cash as possible for corporate ventures for maximum returns; and
- Effective dealing in forex, money and commodity markets to reduce risks arising because of fluctuating exchange rates, interest rates and prices which can in turn affect the profitability of the organization.



8. FUNCTIONS OF TREASURY DEPARTMENT

The treasury department have evolved in importance over number of years from being responsible for only cash handling issues to technical areas revolving around hedging forex risks, composition of capital structure etc. The fundamental tasks for which treasury department of any enterprise is responsible are :-

1. **Cash Management:** It involves efficient cash collection process and managing payment of cash both inside the organisation and to third parties.

There may be complete centralization within a group treasury or the treasury may simply advise subsidiaries and divisions on policy matter viz., collection/payment periods, discounts, etc.

Treasury will also manage surplus funds in an investment portfolio. Investment policy will consider future needs for liquid funds and acceptable levels of risk as determined by company policy.

2. **Currency Management:** The treasury department manages the foreign currency risk exposure of the company. In a large multinational company (MNC) the first step will usually be to set off intra-group indebtedness. The use of matching receipts and payments in the same currency will save transaction costs and also will save the organization from any unfavorable exchange movements. Accordingly, Treasury might advise on the currency to be used when invoicing overseas sales.

The treasury will manage any net exchange exposures in accordance with company policy. If risks are to be minimized then forward contracts can be used either to buy or sell currency forward.

3. **Fund Management:** Treasury department is responsible for planning and sourcing the company's short, medium and long-term cash needs. They also facilitate temporary investment of surplus funds by mapping the time gap between funds inflow and outflow. Treasury department will also participate in the decision on capital structure and forecast future interest and foreign currency rates.
4. **Banking:** It is important that a company maintains a good relationship with its bankers. Treasury department carry out negotiations with bankers with respect to interest rates, foreign exchange rates etc. and act as the initial point of contact with them. Short-term finance can come in the form of bank loans or through the sale of commercial paper in the money market.

5. **Corporate Finance:** Treasury department is involved with both acquisition and divestment activities within the group. In addition, it will often have responsibility for investor relations. The latter activity has assumed increased importance in markets where share-price performance is regarded as crucial and may affect the company's ability to undertake acquisition activity or, if the price falls drastically, render it vulnerable to a hostile bid.

9. MANAGEMENT OF CASH

Management of cash is an important function of the finance manager. It is concerned with the managing of:

- (i) Cash flows into and out of the firm;
- (ii) Cash flows within the firm; and
- (iii) Cash balances held by the firm at a point of time by financing deficit or investing surplus cash.

The main objectives of cash management for a business are:-

- Provide adequate cash to each of its units as per requirements;
- No funds are blocked in idle cash; and
- The surplus cash (if any) should be invested in order to maximize returns for the business.

A cash management scheme therefore, is a delicate balance between the twin objectives of liquidity and costs.

9.1 The Need for Cash

The following are three basic considerations in determining the amount of cash or liquidity as have been outlined by Lord Keynes, a British Economist:

- *Transaction need:* Cash facilitates the meeting of the day-to-day expenses and other debt payments. Normally, inflows of cash from operations should be sufficient for this purpose. But sometimes this inflow may be temporarily blocked. In such cases, it is only the reserve cash balance that can enable the firm to make its payments in time.

- *Speculative needs:* Cash may be held in order to take advantage of profitable opportunities that may present themselves and which may be lost for want of ready cash/settlement.
- *Precautionary needs:* Cash may be held to act as for providing safety against unexpected events. Safety as is explained by the saying that a man has only three friends an old wife, an old dog and money at bank.

9.2 Cash Planning

Cash Planning is a technique to plan and control the use of cash. This protects the financial conditions of the firm by developing a projected cash statement from a forecast of expected cash inflows and outflows for a given period. This may be done periodically either on daily, weekly or monthly basis. The period and frequency of cash planning generally depends upon the size of the firm and philosophy of the management. As firms grows and business operations become complex, cash planning becomes inevitable for continuing success.

The very first step in this direction is to estimate the requirement of cash. For this purpose, cash flow statements and cash budget are required to be prepared. The technique of preparing cash flow and funds flow statements have been discussed in Accounting paper at Intermediate level of CA course. The preparation of cash budget has however, been demonstrated here.

9.3 Cash Budget

Cash Budget is the most significant device to plan for and control cash receipts and payments. This represents cash requirements of business during the budget period.

The various purposes of cash budgets are:-

- Coordinate the timings of cash needs. It identifies the period(s) when there might either be a shortage of cash or an abnormally large cash requirement;
- It also helps to pinpoint period(s) when there is likely to be excess cash;
- It enables firm which has sufficient cash to take advantage like cash discounts on its accounts payable; and
- Lastly it helps to plan/arrange adequately needed funds (avoiding excess/shortage of cash) on favorable terms.

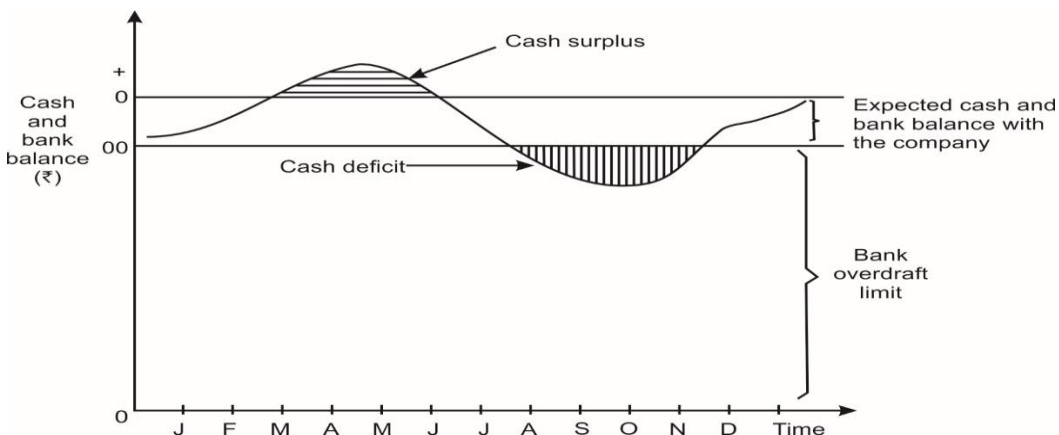
On the basis of cash budget, the firm can decide to invest surplus cash in marketable securities and earn profits. On the contrary, any shortages can also be managed by making overdraft or credit arrangements with banks.

Main Components of Cash Budget

Preparation of cash budget involves the following steps:-

- (a) Selection of the period of time to be covered by the budget. It also defines the planning horizon.
- (b) Selection of factors that have a bearing on cash flows. The factors that generate cash flows are generally divided into following two categories:-
 - (i) Operating (cash flows generated by operations of the firm); and
 - (ii) Financial (cash flows generated by financial activities of the firm).

The following figure highlights the cash surplus and cash shortage position over the period of cash budget for preplanning to take corrective and necessary steps.



10. METHODS OF CASH FLOW BUDGETING

A cash budget can be prepared in the following ways:

1. **Receipts and Payments Method:** In this method all the expected receipts and payments for budget period are considered. All the cash inflow and outflow of all functional budgets including capital expenditure budgets are considered. Accruals and adjustments in accounts will not affect the cash

flow budget. Anticipated cash inflow is added to the opening balance of cash and all cash payments are deducted from this to arrive at the closing balance of cash. This method is commonly used in business organizations.

2. **Adjusted Income Method:** In this method the annual cash flows are calculated by adjusting the sales revenue and cost figures for delays in receipts and payments (change in debtors and creditors) and eliminating non-cash items such as depreciation.
3. **Adjusted Balance Sheet Method:** In this method, the budgeted balance sheet is predicted by expressing each type of asset (except cash & bank) and short-term liabilities as percentage of the expected sales. The profit is also calculated as a percentage of sales, so that the increase in owner's equity can be forecasted. Known adjustments, may be made to long-term liabilities and the balance sheet will then show if additional finance is needed (if budgeted assets exceed budgeted liabilities) or if there will be a positive cash balance (if budgeted liabilities exceed budgeted assets).

It is important to note that the capital budget will also be considered in the preparation of cash flow budget because the annual budget may disclose a need for new capital investments and also, the costs and revenues of any new projects coming on stream will need to be incorporated in the short-term budgets.

The Cash Budget can be prepared for short period or for long period.

10.1 Cash budget for short period

Preparation of cash budget month by month would require the following estimates:

- (a) *As regards receipts:*
 1. Receipts from debtors;
 2. Cash Sales; and
 3. Any other source of receipts of cash (say, dividend from a subsidiary company)
- (b) *As regards payments:*
 1. Payments to be made for purchases;

2. Payments to be made for expenses;
3. Payments that are made periodically but not every month;
 - (i) Debenture interest;
 - (ii) Income tax paid in advance;
 - (iii) Sales tax or GST etc.
4. Special payments to be made in a particular month, for example, dividends to shareholders, redemption of debentures, repayments of loan, payment of assets acquired, etc.

Format of Cash Budget

_____ Co. Ltd.

Cash Budget

Period _____

	Month 1	Month 2	Month 3		Month 12
<i>Receipts:</i>					
1. Opening balance					
2. Collection from debtors					
3. Cash sales					
4. Loans from banks					
5. Share capital					
6. Miscellaneous receipts					
7. Other items					
Total					
<i>Payments:</i>					
1. Payments to creditors					
2. Wages					

3. Overheads					
(a)					
(b)					
(c)					
4. Interest					
5. Dividend					
6. Corporate tax					
7. Capital expenditure					
8. Other items					
Total					
Closing balance					
[Surplus (+)/Shortfall (-)]					

Students are required to do good practice in preparing the cash budgets. The following illustration will show how short-term cash budgets can be prepared.

ILLUSTRATION 6

PREPARE monthly cash budget for six months beginning from April 2022 on the basis of the following information:

(i) *Estimated monthly sales are as follows:*

	₹		₹
January	1,00,000	June	80,000
February	1,20,000	July	1,00,000
March	1,40,000	August	80,000
April	80,000	September	60,000
May	60,000	October	1,00,000

(ii) *Wages and salaries are estimated to be payable as follows:-*

	₹		₹
April	9,000	July	10,000

May	8,000	August	9,000
June	10,000	September	9,000

- (iii) Of the sales, 80% is on credit and 20% for cash. 75% of the credit sales are collected within one month after sale and the balance in two months after sale. There are no bad debt losses.
- (iv) Purchases amount to 80% of sales and are made on credit and paid for in the month preceding the sales.
- (v) The firm has 10% debentures of ₹ 1,20,000. Interest on these has to be paid quarterly in January, April and so on.
- (vi) The firm is to make an advance payment of tax of ₹ 5,000 in July, 2022.
- (vii) The firm had a cash balance of ₹ 20,000 on April 1, 2022, which is the minimum desired level of cash balance. Any cash surplus/deficit above/below this level is made up by temporary investments/liquidation of temporary investments or temporary borrowings at the end of each month (interest on these to be ignored).

SOLUTION

Workings:

Collection from debtors:

(Amount in ₹)

	February	March	April	May	June	July	August	September
Total sales	1,20,000	1,40,000	80,000	60,000	80,000	1,00,000	80,000	60,000
Credit sales (80% of total sales)	96,000	1,12,000	64,000	48,000	64,000	80,000	64,000	48,000
Collections:								
One month		72,000	84,000	48,000	36,000	48,000	60,000	48,000
Two months			24,000	28,000	16,000	12,000	16,000	20,000
Total collections			1,08,000	76,000	52,000	60,000	76,000	68,000

Monthly Cash Budget for Six months, April to September, 2022

(Amount in ₹)

	April	May	June	July	August	September
Receipts:						
Opening balance	20,000	20,000	20,000	20,000	20,000	20,000
Cash sales	16,000	12,000	16,000	20,000	16,000	12,000
Collection from debtors	1,08,000	76,000	52,000	60,000	76,000	68,000
Total cash available (A)	1,44,000	1,08,000	88,000	1,00,000	1,12,000	1,00,000
Payments:						
Purchases	48,000	64,000	80,000	64,000	48,000	80,000
Wages & salaries	9,000	8,000	10,000	10,000	9,000	9,000
Interest on debentures	3,000	---	---	3,000	---	---
Tax payment	---	---	---	5,000	---	---
Total payments (B)	60,000	72,000	90,000	82,000	57,000	89,000
Minimum cash balance desired	20,000	20,000	20,000	20,000	20,000	20,000
Total cash needed (C)	80,000	92,000	1,10,000	1,02,000	77,000	1,09,000
Surplus - deficit (A-C)	64,000	16,000	(22,000)	(2,000)	35,000	(9,000)
Investment/financing						
Temporary Investments	(64,000)	(16,000)	----		(35,000)	-----
Liquidation of temporary investments or temporary borrowings	----	----	22,000	2,000	----	9,000
Total effect of investment/financing (D)	(64,000)	(16,000)	22,000	2,000	(35,000)	9,000
Closing cash balance (A+D-B)	20,000	20,000	20,000	20,000	20,000	20,000

ILLUSTRATION 7

From the following information relating to a departmental store, you are required to PREPARE for the three months ending 31st March, 2022:

- (a) Month-wise cash budget on receipts and payments basis; and
 (b) Statement of Sources and uses of funds for the three months period.

It is anticipated that the working capital & other account balances at 1st January, 2022 will be as follows:

			₹ in '000
Cash in hand and at bank			545
Short term investments			300
Debtors			2,570
Stock			1,300
Trade creditors			2,110
Other creditors			200
Dividends payable			485
Tax due			320
Plant			800

Budgeted Profit Statement:	₹ in '000		
	January	February	March
Sales	2,100	1,800	1,700
Cost of goods sold	1,635	1,405	1,330
Gross Profit	465	395	370
Administrative, Selling and Distribution Expenses	315	270	255
Net Profit before tax	150	125	115

Budgeted balances at the end of each months	₹ in '000		
	31st Jan.	28th Feb.	31st March
Short term investments	700	---	200
Debtors	2,600	2,500	2,350
Stock	1,200	1,100	1,000

Trade creditors	2,000	1,950	1,900
Other creditors	200	200	200
Dividends payable	485	--	--
Tax due	320	320	320
Plant (depreciation ignored)	800	1,600	1,550

Depreciation amount to ₹ 60,000 is included in the budgeted expenditure for each month.

SOLUTION

WORKING

		₹ in '000		
		Jan.	Feb.	March
(1)	Payments to creditors:			
	Cost of goods sold	1,635	1,405	1,330
	Add: Closing Stocks	1,200	1,100	1,000
		2,835	2,505	2,330
	Less: Opening Stocks	1,300	1,200	1,100
	Purchases	1,535	1,305	1,230
	Add: Trade Creditors, Opening balance	2,110	2,000	1,950
		3,645	3,305	3,180
	Less: Trade Creditors, closing balance	2,000	1,950	1,900
	Payment	1,645	1,355	1,280
(2)	Receipts from debtors:			
	Debtors, Opening balances	2,570	2,600	2,500
	Add: Sales	2,100	1,800	1,700
		4,670	4,400	4,200
	Less: Debtors, closing balance	2,600	2,500	2,350
	Receipt	2,070	1,900	1,850

CASH BUDGET**(a) 3 months ending 31st March, 2022**

(₹ in 000)			
	January, 2022	February, 2022	March, 2022
Opening cash balances	545	315	65
<i>Add: Receipts:</i>			
From Debtors	2,070	1,900	1,850
Sale of Investments	---	700	----
Sale of Plant	---	---	50
Total (A)	2,615	2,915	1,965
<i>Deduct: Payments</i>			
Creditors	1,645	1,355	1,280
Expenses	255	210	195
Capital Expenditure	---	800	---
Payment of dividend	---	485	---
Purchase of investments	400	---	200
Total payments (B)	2,300	2,850	1,675
Closing cash balance (A-B)	315	65	290

(b) Statement of Sources and uses of Funds for the three month period ending 31st March, 2022

	₹ '000	₹ '000
Sources:		
Funds from operation:		
Net profit (150+125+115)	390	
<i>Add: Depreciation (60×3)</i>	180	570
Sale of plant		50
		620

Decrease in Working Capital (Refer Statement of changes in working capital)		665
Total		1,285
Uses:		
Purchase of plant		800
Payment by dividends		485
Total		1,285

Statement of Changes in Working Capital

	January,22	March,22	Increase	Decrease
	₹' 000	₹' 000	₹' 000	₹' 000
<i>Current Assets</i>				
Cash in hand and at Bank	545	290		255
Short term Investments	300	200		100
Debtors	2,570	2,350		220
Stock	1,300	1,000		300
	4,715	3,840		
<i>Current Liabilities</i>				
Trade Creditors	2,110	1,900	210	---
Other Creditors	200	200	---	---
Tax Due	320	320	---	---
	2,630	2,420		
Working Capital	2,085	1,420		
Decrease	-	665	665	
	2,085	2,085	875	875

10.2 Cash Budget for long period

Long-range cash forecast often resemble the projected sources and application of funds statement. The following procedure may be adopted to prepare long-range cash forecasts:

- Take the cash at bank and in the beginning of the year**

(ii) **Add:**

- (a) Trading profit (before tax) expected to be earned;
- (b) Depreciation and other development expenses incurred to be written off;
- (c) Sale proceeds of assets;
- (d) Proceeds of fresh issue of shares or debentures; and
- (e) Reduction in working capital that is current assets (except cash) less current liabilities.

(iii) **Deduct:**

- (a) Dividends to be paid.
- (b) Cost of assets to be purchased.
- (c) Taxes to be paid.
- (d) Debentures or preference shares to be redeemed.
- (e) Increase in working capital that is current assets (except cash) less current liabilities.

ILLUSTRATION 8

You are given below the Profit & Loss Accounts for two years for a company:

Profit and Loss Account

	Year 1	Year 2		Year 1	Year 2
	₹	₹		₹	₹
To Opening stock	80,00,000	1,00,00,000	By Sales	8,00,00,000	10,00,00,000
To Raw materials	3,00,00,000	4,00,00,000	By Closing stock	1,00,00,000	1,50,00,000
To Stores	1,00,00,000	1,20,00,000	By Misc. Income	10,00,000	10,00,000
To Manufacturing Expenses	1,00,00,000	1,60,00,000			
To Other Expenses	1,00,00,000	1,00,00,000			
To Depreciation	1,00,00,000	1,00,00,000			
To Net Profit	1,30,00,000	1,80,00,000		-	-
	9,10,00,000	11,60,00,000		9,10,00,000	11,60,00,000

Sales are expected to be ₹ 12,00,00,000 in year 3.

As a result, other expenses will increase by ₹ 50,00,000 besides other charges. Only raw materials are in stock. Assume sales and purchases are in cash terms and the closing stock is expected to go up by the same amount as between year 1 and 2. You may assume that no dividend is being paid. The Company can use 75% of the cash generated to service a loan. COMPUTE how much cash from operations will be available in year 3 for the purpose? Ignore income tax.

SOLUTION

Projected Profit and Loss Account for the year 3

	Year 2 Actual (₹ in lakhs)	Year 3 Projected (₹ in lakhs)		Year 2 Actual (₹ in lakhs)	Year 3 Projected (₹ in lakhs)
To Materials consumed	350	420	By Sales	1,000	1,200
To Stores	120	144	By Misc. Income	10	10
To Mfg. Expenses	160	192			
To Other expenses	100	150			
To Depreciation	100	100			
To Net profit	180	204			
	1,010	1,210		1,010	1,210

Cash Flow:

	(₹ in lakhs)
Profit	204
Add: Depreciation	100
	304
Less: Cash required for increase in stock	50
Net cash inflow	254

Available for servicing the loan: 75% of ₹ 2,54,00,000 or ₹ 1,90,50,000

Working Notes:

- (i) Material consumed in year 2: 35% of sales.

Likely consumption in year 3: ₹1,200 × $\frac{35}{100}$ or ₹420 (lakhs)

- (ii) Stores are 12% of sales, as in year 2.

- (iii) Manufacturing expenses are 16% of sales.

Note: The above also shows how a projected profit and loss account is prepared.

10.3 Managing Cash Collection and Disbursements

Having prepared the cash budget, the finance manager should ensure that there is not a significant deviation between projected cash flows and actual cash flows.

To achieve this cash management, efficiency will have to be brought in by proper control of cash collection and disbursement.

The twin objectives in managing the cash flows should be:-

- Accelerate cash collections as much as possible; and
- Decelerate or delay cash disbursements within permissible time frame.

Let's discuss each of the two objectives individually.

10.4 Accelerating Cash Collections

Different Kinds of Float with reference to Management of Cash: First, let's understand the time involved in the cash collection process. The term float is used to refer to the periods that affect cash as it moves through the different stages of the collection process. Four kinds of float with reference to management of cash are:

- **Billing float:** An invoice is the formal document that a seller prepares and sends to the purchaser as the payment request for goods sold or services provided. The time between the sale and the mailing of the invoice is known as billing float.
- **Mail float:** This is the time when a cheque is being carried by post office, messenger service or other means of delivery.

- **Cheque processing float:** This is the time required for the seller to sort, record and deposit the cheque after it has been received by the company.
- **Banking processing float:** This is the time from the deposit of the cheque to the crediting of funds in the sellers' account.

There are multiple ways in which a firm can attempt to reduce or eliminate any or all types of floats above. For instance:

- ◆ A firm can conserve cash and reduce its requirements for cash balances if it can speed up its cash collections by issuing invoices quickly (reducing / eliminating billing float);
- ◆ By reducing the time lag between a customer pays bill and the cheque is collected (reducing / eliminating mail float);
- ◆ Making funds become available for the firm's use (reducing / eliminating processing floats).

A firm can also use decentralized collection system known as concentration banking and lock box system to speed up cash collection and reduce float time.

- (i) **Concentration Banking:** In concentration banking, the company establishes a number of strategic collection centers in different regions instead of a single collection center at the head office. This system reduces the period between the time a customer mails in his remittances and the time when they become spendable funds with the company. Payments received by the different collection centers are deposited with their respective local banks which in turn transfer all surplus funds to the concentration bank of head office. The concentration bank with which the company has its major bank account is generally located at the headquarters. Concentration banking is one important and popular way of reducing the size of the float.
- (ii) **Lock Box System:** Another means to accelerate the flow of funds is a lock box system. While concentration banking, remittances are received by a collection center and deposited in the bank after processing. The purpose of lock box system is to eliminate the time between the receipts of remittances by the company and deposited in the bank. A lock box arrangement usually is on regional basis which a company chooses according to its billing patterns.

Under this arrangement, the company rents the local post-office box and authorizes its bank at each of the locations to pick up remittances in the boxes. Customers are billed with instructions to mail their remittances to the lock boxes. The bank picks up the mail several times a day and deposits the cheques in the company's account. The cheques may be micro-filmed for record purposes and cleared for collection. The company receives a deposit slip and lists all payments together with any other material in the envelope. This procedure frees the company from handling and depositing the cheques.

The main advantage of lock box system is that cheques are deposited with the banks sooner and become collected funds sooner than if they were processed by the company prior to deposit. In other words, lag between the time cheques are received by the company and the time they are actually deposited in the bank (i.e. cheque processing float) is eliminated.

The main drawback of lock box system is the cost of its operation. The bank provides a number of services in addition to usual clearing of cheques and requires compensation for them. Since the cost is almost directly proportional to the number of cheques deposited. Lock box arrangements are usually not profitable if the average remittance is small. The appropriate rule for deciding whether or not to use a lock box system or for that matter, concentration banking, is simply to compare the added cost of the most efficient system with the marginal income that can be generated from the released funds. If costs are less than income, the system is profitable and if the system is not profitable, it is not worth undertaking.

10.5 Controlling Payments

An effective control over payments can also cause faster turnover of cash. This is possible only by making payments on the due date, making excessive use of draft (bill of exchange) instead of cheques.

Availability of cash can be maximized by playing the float. In this, a firm estimates accurately the time when the cheques issued will be presented for encashment and thus utilizes the float period to its advantage by issuing more cheques but having in the bank account only so much cash balance as will be sufficient to honour those cheques which are actually expected to be presented on a particular date.

Also, the company may make payment to its outstation suppliers by a cheque and send it through mail. The delay in transit and collection of the cheque, will be used to increase the float.

ILLUSTRATION 9

Prachi Ltd is a manufacturing company producing and selling a range of cleaning products to wholesale customers. It has three suppliers and two customers. Prachi Ltd relies on its cleared funds forecast to manage its cash.

You are an accounting technician for the company and have been asked to prepare a cleared funds forecast for the period Saturday 9 August to Wednesday 13 August 20X2 inclusive. You have been provided with the following information:

(1) Receipts from customers

	Credit terms	Payment method	9 Aug 20X2 sales	9 Jul 20X2 sales
W Ltd	1 calendar month	BACS	₹ 150,000	₹ 130,000
X Ltd	None	Cheque	₹ 180,000	₹ 160,000

- (a) Receipt of money by BACS (**Bankers' Automated Clearing Services**) is instantaneous.
- (b) X Ltd's cheque will be paid into Prachi Ltd's bank account on the same day as the sale is made and will clear on the third day following this (excluding day of payment).

(2) Payments to suppliers

Supplier name	Credit terms	Payment method	9 Aug 20X2 purchases	9 Jul 20X2 purchases	9 Jun 20X2 purchases
A Ltd	1 calendar month	Standing order	₹ 65,000	₹ 55,000	₹ 45,000
B Ltd	2 calendar months	Cheque	₹ 85,000	₹ 80,000	₹ 75,000
C Ltd	None	Cheque	₹ 95,000	₹ 90,000	₹ 85,000

- (a) Prachi Ltd has set up a standing order for ₹ 45,000 a month to pay for supplies from A Ltd. This will leave Prachi's bank account on 9 August.

Every few months, an adjustment is made to reflect the actual cost of supplies purchased (you do NOT need to make this adjustment).

- (b) Prachi Ltd will send out, by post, cheques to B Ltd and C Ltd on 9 August. The amounts will leave its bank account on the second day following this (excluding the day of posting).

(3) Wages and salaries

	July 20X2	August 20X2
Weekly wages	₹ 12,000	₹ 13,000
Monthly salaries	₹ 56,000	₹ 59,000

- (a) Factory workers are paid cash wages (weekly). They will be paid one week's wages, on 13 August, for the last week's work done in July (i.e. they work a week in hand).
- (b) All the office workers are paid salaries (monthly) by BACS. Salaries for July will be paid on 9 August.

(4) Other miscellaneous payments

- (a) Every Saturday morning, the petty cashier withdraws ₹ 200 from the company bank account for the petty cash. The money leaves Prachi's bank account straight away.
- (b) The room cleaner is paid ₹ 30 from petty cash every Monday morning.
- (c) Office stationery will be ordered by telephone on Sunday 10 August to the value of ₹ 300. This is paid for by company debit card. Such payments are generally seen to leave the company account on the next working day.
- (d) Five new softwares will be ordered over the Internet on 12 August at a total cost of ₹ 6,500. A cheque will be sent out on the same day. The amount will leave Prachi Ltd's bank account on the second day following this (excluding the day of posting).

(5) Other information

The balance on Prachi's bank account will be ₹ 200,000 on 9 August 20X2. This represents both the book balance and the cleared funds.

PREPARE a cleared funds forecast for the period Saturday 7th August to Wednesday 13th August 20X2 inclusive using the information provided. Show clearly the uncleared funds float each day.

SOLUTION**Cleared Funds Forecast**

	9 Aug (Saturday) ₹	10 Aug (Sunday) ₹	11 Aug (Monday) ₹	12 Aug (Tuesday) ₹	13Aug (Wednesday) ₹
Receipts					
W Ltd	1,30,000	0	0	0	0
X Ltd	<u>0</u>	<u>0</u>	<u>0</u>	<u>1,80,000</u>	<u>0</u>
(a)	<u>1,30,000</u>	<u>0</u>	<u>0</u>	<u>1,80,000</u>	<u>0</u>
Payments					
A Ltd	45,000	0	0	0	0
B Ltd	0	0	75,000	0	0
C Ltd	0	0	95,000	0	0
Wages	0	0	0	0	12,000
Salaries	56,000	0	0	0	0
Petty Cash	200	0	0	0	0
Stationery	<u>0</u>	<u>0</u>	<u>300</u>	<u>0</u>	<u>0</u>
(b)	<u>1,01,200</u>	<u>0</u>	<u>1,70,300</u>	<u>0</u>	<u>12,000</u>
Cleared excess Receipts over payments (a) – (b)	28,800	0	(1,70,300)	1,80,000	(12,000)
Cleared balance b/f	<u>2,00,000</u>	<u>2,28,800</u>	<u>2,28,800</u>	<u>58,500</u>	<u>2,38,500</u>
Cleared balance c/f (c)	<u>2,28,800</u>	<u>2,28,800</u>	<u>58,500</u>	<u>2,38,500</u>	<u>2,26,500</u>
Uncleared funds float					
Receipts	1,80,000	1,80,000	1,80,000	0	0
Payments	<u>(1,70,000)</u>	<u>(1,70,300)</u>	<u>0</u>	<u>(6,500)</u>	<u>(6,500)</u>
(d)	<u>10,000</u>	<u>9,700</u>	<u>180,000</u>	<u>(6,500)</u>	<u>(6,500)</u>
Total book balance c/f	2,38,800	2,38,500	2,38,500	2,32,000	2,20,000
(c) + (d)					

10.6 Determining the Optimum Cash Balance

A firm should maintain optimum cash balance to cater to the day-to-day operations. It may also carry additional cash as a buffer or safety stock. The amount of cash balance will depend on the risk-return trade off. The firm should maintain an optimum level i.e. just enough, i.e. neither too much (to avoid any opportunity cost) nor too little cash balance (to settle day to day payments). This, however, poses a question. How to determine the optimum cash balance if cash flows are predictable and if they are not predictable?

11. CASH MANAGEMENT MODELS

In recent years several types of mathematical models have been developed which helps to determine the optimum cash balance to be carried by a business organization.

The purpose of all these models is to ensure that cash does not remain idle unnecessarily and at the same time the firm is not confronted with a situation of cash shortage.

All these models can be put in two categories:

Inventory type models; and Stochastic models.

Inventory type models have been constructed to aid the finance manager to determine optimum cash balance of his firm. William J. Baumol's economic order quantity model applies equally to cash management problems under conditions of certainty or where the cash flows are predictable.

However, in a situation where the EOQ Model is not applicable, stochastic model of cash management helps in determining the optimum level of cash balance. It happens when the demand for cash is stochastic and not known in advance.

11.1 William J. Baumol's Economic Order Quantity Model,(1952)

According to this model, **optimum cash level is that level of cash where the carrying costs and transactions costs are the minimum.**

The carrying costs refer to the cost of holding cash, namely, the opportunity cost or interest foregone on marketable securities. The transaction costs refer to the cost involved in getting the marketable securities converted into cash. This happens when the firm falls short of cash and has to sell the securities resulting in clerical, brokerage, registration and other costs.

The optimum cash balance according to this model will be that point where these two costs are minimum. The formula for determining optimum cash balance is:

$$C = \sqrt{\frac{2U \times P}{S}}$$

Where,

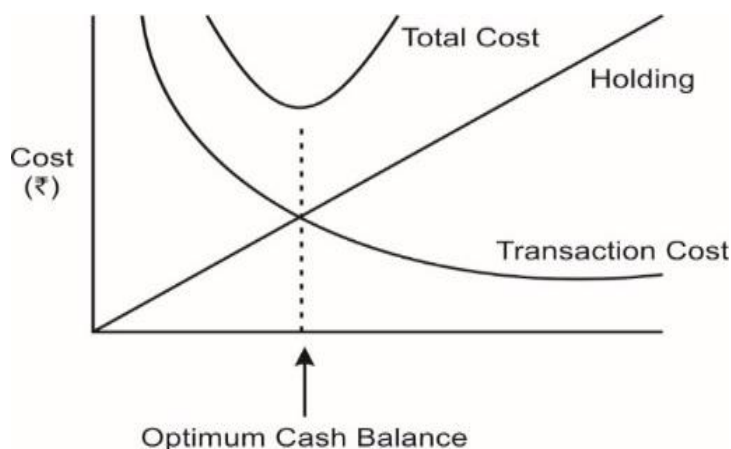
C = Optimum cash balance

U = Annual (or monthly) cash disbursement

P = Fixed cost per transaction.

S = Opportunity cost of one rupee p.a. (or p.m.)

This can be explained with the following diagram:



The model is based on the following assumptions:

- (i) Cash needs of the firm are known with certainty.
- (ii) The cash is used uniformly over a period of time and it is also known with certainty.
- (iii) The holding cost is known and it is constant.
- (iv) The transaction cost also remains constant.

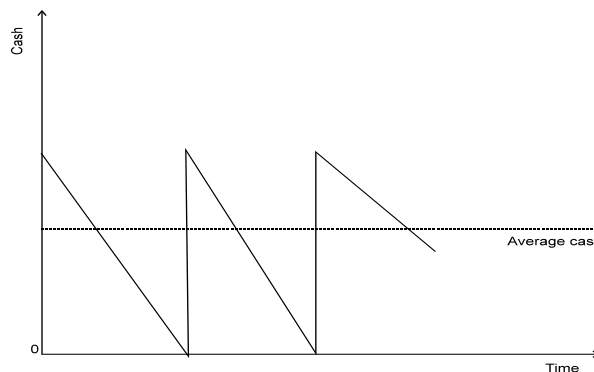
ILLUSTRATION 10

A firm maintains a separate account for cash disbursement. Total disbursement are ₹ 1,05,000 per month or ₹ 12,60,000 per year. Administrative and transaction cost of transferring cash to disbursement account is ₹ 20 per transfer. Marketable securities yield is 8% per annum.

DETERMINE the optimum cash balance according to William J. Baumol model.

SOLUTION

$$\text{The optimum cash balance } C = \sqrt{\frac{2 \times ₹ 12,60,000 \times ₹ 20}{0.08}} = ₹ 25,100$$



The limitation of the Baumol's model is that it does not allow the cash flows to fluctuate. Firms in practice do not use their cash balance uniformly nor are they able to predict daily cash inflows and outflows. The Miller-Orr (MO) model, as discussed below, overcomes this shortcoming and allows for daily cash flow variation.

11.2 Miller-Orr Cash Management Model (1966)

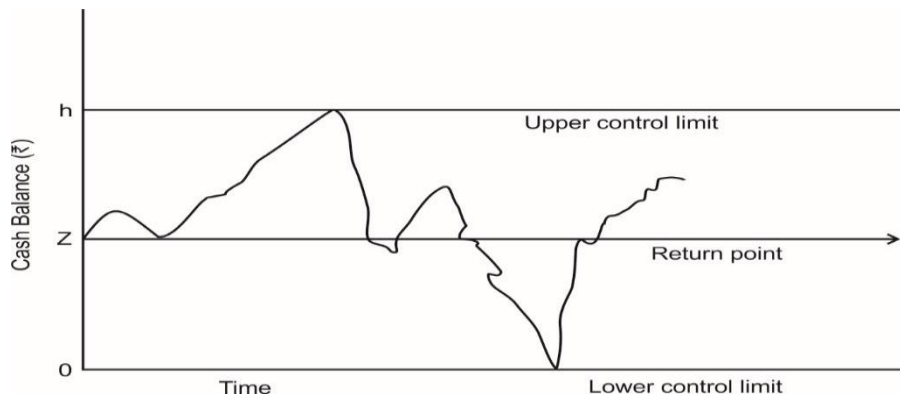
According to this model the net **cash flow is completely stochastic**.

When changes in cash balance occur randomly the application of control theory serves a useful purpose. The Miller-Orr model is one of such control limit models.

This model is designed to determine the time and size of transfers between an investment account and cash account. In this model control limits are set for cash balances. These limits may consist of h as upper limit, z as the return point; and zero as the lower limit.

- When the cash balance reaches the upper limit, the transfer of cash equal to $h - z$ is invested in marketable securities account.
- When it touches the lower limit, a transfer from marketable securities account to cash account is made.
- During the period when cash balance stays between (h, z) and $(z, 0)$ i.e. high and low limits no transactions between cash and marketable securities account is made.

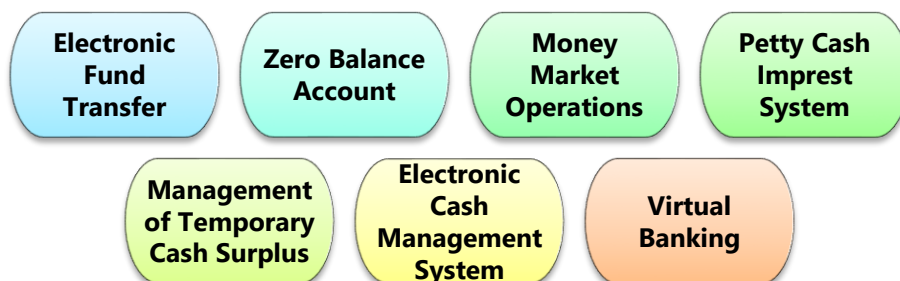
The high and low limits of cash balance are set up on the basis of fixed cost associated with the securities transactions, the opportunity cost of holding cash and the degree of likely fluctuations in cash balances. These limits satisfy the demands for cash at the lowest possible total costs. The following diagram illustrates the Miller-Orr model.



The MO Model is more realistic since it allows variations in cash balance within lower and upper limits. The finance manager can set the limits according to the firm's liquidity requirements i.e., maintaining minimum and maximum cash balance.

12. RECENT DEVELOPMENTS IN CASH MANAGEMENT

It is important to understand the latest developments in the field of cash management, since it has a great impact on how we manage our cash. Both technological advancement and desire to reduce cost of operations has led to some innovative techniques in managing cash. Some of them are:-



12.1 Electronic Fund Transfer

With the developments which took place in the Information technology, the present banking system is switching over to the computerisation of banks branches to offer efficient banking services and cash management services to their customers. The network will be linked to the different branches, banks. This will help the customers in the following ways:

- Instant updating of accounts.
- Quick transfer of funds.
- Instant information about foreign exchange rates.

12.2 Zero Balance Account

For efficient cash management some firms employ an extensive policy of substituting marketable securities for cash by the use of zero balance accounts. Every day the firm totals the cheques presented for payment against the account. The firm transfers the balance amount of cash (in excess of payments) in the account if any, for buying marketable securities. In case of shortage of cash, the firm sells the marketable securities.

12.3 Money Market Operations

One of the tasks of '*treasury function*' of larger companies is the investment of surplus funds in the money market. The chief characteristic of money market banking is one of size. Banks obtain funds by competing in the money market for the deposits by the companies, public authorities, High Net worth Investors (HNI), and other banks. Deposits are made for specific periods ranging from overnight to one year; highly competitive rates which reflect supply and demand on a daily, even

hourly basis are quoted. Consequently, the rates can fluctuate quite dramatically, especially for the shorter-term deposits. Surplus funds can thus be invested in money market easily.

12.4 Petty Cash Imprest System

For better control on cash, generally the companies use petty cash imprest system wherein the day-to-day petty expenses are estimated taking into account past experience and future needs and generally a week's requirement of cash will be kept separate for making petty expenses. Again, the next week will commence with the pre-determined balance. This will reduce the strain of the management in managing petty cash expenses and help in the managing cash efficiently.

12.5 Management of Temporary Cash Surplus

Temporary cash surpluses can be profitably invested in the following:

- Short-term deposits in Banks and financial institutions.
 - Short-term debt market instruments.
 - Or Long Term Debt Instruments with flexible maturity dates
- Shares of Blue chip listed companies.

Choice of investment can be based on economic situation, volatility of returns and also the risk appetite of the organization.

12.6 Electronic Cash Management System

Most of the cash management systems now-a-days are electronically based, since 'speed' is the essence of any cash management system. Electronically, transfer of data as well as funds play a key role in any cash management system. Various elements in the process of cash management are linked through a satellite. Various places that are interlinked may be the place where the instrument is collected, the place where cash is to be transferred in company's account, the place where the payment is to be transferred etc.

Certain networked cash management system may also provide a very limited access to third parties like parties having very regular dealings of receipts and payments with the company etc. A finance company accepting deposits from public through

sub-brokers may give a limited access to sub-brokers to verify the collections made through him for determination of his commission among other things.

Electronic-scientific cash management results in:

- Significant saving in time.
- Increase in interest earned & decrease in interest expense.
- Reduces paper-work & hence manpower.
- Greater accounting accuracy as it allows easy detection of book-keeping errors.
- More control over time and funds.
- Supports electronic payments.
- Faster transfer of funds from one location to another, where required.
- Speedy conversion of various instruments into cash.
- Making available funds wherever required, whenever required.
- Reduction in the amount of 'idle float' to the maximum possible extent.
- Ensures no idle funds are placed at any place in the organization.
- It makes inter-bank balancing of funds much easier.
- It is a true form of centralized 'Cash Management'.
- Produces faster electronic reconciliation.
- Reduces the number of cheques issued.

12.7 Virtual Banking

The practice of banking has undergone a significant change in the nineties. While banks are striving to strengthen customer base and relationship and move towards relationship banking, customers are increasingly moving away from the confines of traditional branch banking and are seeking the convenience of remote electronic banking services including net banking & mobile banking. And even within the broad spectrum of electronic banking the virtual banking has gained prominence

Broadly virtual banking denotes the provision of banking and related services through extensive use of information technology without direct recourse to the bank by the customer. The origin of virtual banking in the developed countries can be traced back to the seventies with the installation of Automated Teller Machines

(ATMs). Subsequently, driven by the competitive market environment as well as various technological and customer pressures, other types of virtual banking services have grown in prominence throughout the world.

The Reserve Bank of India has been taking a number of initiatives, which will facilitate the active involvement of commercial banks in the sophisticated cash management system. One of the pre-requisites to ensure faster and reliable mobility of funds in a country is to have an efficient payment system. Considering the importance of speed in payment system to the economy, the RBI has taken numerous measures since mid-Eighties to strengthen the payments mechanism in the country.

Introduction of computerized settlement of clearing transactions, use of Magnetic Ink Character Recognition (MICR) technology, provision of inter-city clearing facilities and high value clearing facilities, Electronic Clearing Service Scheme (ECSS), Electronic Funds Transfer (EFT) scheme, UPI payment platforms, Real Time Gross Settlement System (RTGS), Delivery vs. Payment (DVP) for Government securities transactions, setting up of Indian Financial Network (INFINET) are some of the significant developments.

Other than above, Introduction of Centralised Funds Management System (CFMS), Securities Services System (SSS) and Structured Financial Messaging System (SFMS) have been the other top priority items on the agenda to transform the existing system into a state-of-the art payment infrastructure in India.

The current vision envisaged for the payment systems reforms is one, which contemplates linking up of all the remaining bank branches with the domestic payment systems network thereby facilitating cross border connectivity. With the help of the systems already put in place in India and which are coming into being, both banks and corporates can exercise effective control over the cash management.

Advantages of Virtual Banking

The advantages of virtual banking services are as follows:

- Lower cost of handling a transaction.
- The increased speed of response to customer requirements.

- The lower cost of operating branch network along with reduced staff costs leads to cost efficiency.
- Virtual banking allows the possibility of improved and a range of services being made available to the customer rapidly, accurately and at his convenience.

The popularity which virtual banking services have won among customers is due to the speed, convenience and round the clock access they offer.

13. MANAGEMENT OF MARKETABLE SECURITIES

Management of marketable securities is an integral part of investment of cash as this may serve both the purposes of liquidity and cash, provided choice of investment is made correctly. As the working capital needs are fluctuating, it is possible to park excess funds in some short-term securities, which can be liquidated when need for cash is felt. The selection of securities should be guided by three principles.

- *Safety:* Return and risks go hand in hand. As the objective in this investment is ensuring liquidity, minimum risk is the criterion of selection.
- *Maturity:* Matching of maturity and forecasted cash needs is essential. Prices of long term securities fluctuate more with changes in interest rates and are therefore, riskier. Since this is for temporary excess funds, short term securities are preferred.
- *Marketability:* It refers to the convenience, speed and cost at which a security can be converted into cash. If the security can be sold quickly without loss of time and price it is highly liquid or marketable.

The choice of marketable securities is mainly limited to Government treasury bills, Deposits with banks and Inter-corporate deposits. Units of Unit Trust of India and commercial papers of corporates are other attractive means of parking surplus funds for companies along with deposits with sister concerns or associate companies.

Besides this Money Market Mutual Funds (MMMFs) have also emerged as one of the avenues of short-term investment.

ILLUSTRATION 11

The following information is available in respect of Sai trading company:

- (i) *On an average, debtors are collected after 45 days; inventories have an average holding period of 75 days and creditor's payment period on an average is 30 days.*
- (ii) *The firm spends a total of ₹ 120 lakhs annually at a constant rate.*
- (iii) *It can earn 10 per cent on investments.*

From the above information, you are required to CALCULATE:

- (a) *The cash cycle and cash turnover,*
- (b) *Minimum amounts of cash to be maintained to meet payments as they become due,*
- (c) *Savings by reducing the average inventory holding period by 30 days.*

SOLUTION

- (a)** Cash cycle = 45 days + 75 days – 30 days = 90 days (3 months)

Cash turnover = 12 months (360 days)/3 months (90 days) = 4.

- (b)** Minimum operating cash = Total operating annual outlay/cash turnover, that is, ₹ 120 lakhs/4 = ₹ 30 lakhs.

- (c)** Cash cycle = 45 days + 45 days – 30 days = 60 days (2 months).

Cash turnover = 12 months (360 days)/2 months (60 days) = 6.

Minimum operating cash = ₹ 120 lakhs/6 = ₹ 20 lakhs.

Reduction in investments = ₹ 30 lakhs – ₹ 20 lakhs = ₹ 10 lakhs.

Savings = 0.10 × ₹ 10 lakhs = ₹ 1 lakh.

UNIT - III

MANAGEMENT OF INVENTORY



14. INVENTORY MANAGEMENT

Inventories constitute a major element of working capital. It is, therefore, important that investment in inventory is properly controlled. The objectives of inventory management are, to a great extent, similar to the objectives of cash management. Inventory management covers a large number of problems including fixation of minimum and maximum levels, determining the size of inventory to be carried, deciding about the issues, receipts and inspection procedures, determining the economic order quantity, proper storage facilities, keeping check over obsolescence and ensuring control over movement of inventories.

Inventory Management has been discussed in detail in Chapter 2 (Material Cost) Paper 4: Cost and Management Accounting. Students are advised to refer the same.

UNIT - IV

MANAGEMENT OF RECEIVABLES



15. MEANING AND OBJECTIVE

Management of receivables refers to planning and controlling of 'debt' owed to the firm from customer on account of credit sales. It is also known as trade credit management.

The basic objective of management of receivables (debtors) is to optimise the return on investment on these assets.

When large amounts are tied up in receivables, there are chances of bad debts and there will be cost of collection of debts. On the contrary, if the investment in receivables is low, the sales may be restricted, since the competitors may offer more liberal terms. Therefore, management of receivables is an important issue and requires proper policies and their implementation.



16. ASPECTS OF MANAGEMENT OF DEBTORS

There are basically three aspects of management of receivables:

1. **Credit Policy:** A balanced credit policy should be determined for effective management of receivables. Decision of Credit standards, Credit terms and collection efforts is included in Credit policy. It involves a trade-off between the profits on additional sales that arise due to credit being extended on the one hand and the cost of carrying those debtors and bad debt losses on the other. This seeks to decide credit period, cash discount and other relevant matters. The credit period is generally stated in terms of net days. For example, if the firm's credit terms are "net 50". It is expected that customers will repay credit obligations not later than 50 days.

Further, the cash discount policy of the firm specifies:

- (a) The rate of cash discount.
- (b) The cash discount period; and
- (c) The net credit period.

For example, the credit terms may be expressed as "3/15 net 60". This means that a 3% discount will be granted if the customer pays within 15 days; if he does not avail the offer he must make payment within 60 days.

2. **Credit Analysis:** This requires the finance manager to determine as to how risky it is to advance credit to a particular party. This involves due diligence or reputation check of the customers with respect to their credit worthiness.
3. **Control of Receivable:** This requires finance manager to follow up debtors and decide about a suitable credit collection policy. It involves both laying down of credit policies and execution of such policies.

There is always cost of maintaining receivables which comprises of following costs:

- (i) The company requires additional funds as resources are blocked in receivables which involves a cost in the form of interest (loan funds) or opportunity cost (own funds)
- (ii) Administrative costs which include record keeping, investigation of credit worthiness etc.
- (iii) Collection costs.
- (iv) Defaulting costs.

17. FACTORS DETERMINING CREDIT POLICY

The credit policy is an important factor determining both the quantity and the quality of accounts receivables. Various factors determine the size of the investment a company makes in accounts receivables. They are, for instance:

- (i) The effect of credit on the volume of sales;
- (ii) Credit terms;
- (iii) Cash discount;
- (iv) Policies and practices of the firm for selecting credit customers;
- (v) Paying practices and habits of the customers;
- (vi) The firm's policy and practice of collection; and

- (vii) The degree of operating efficiency in the billing, record keeping and adjustment function, other costs such as interest, collection costs and bad debts etc., would also have an impact on the size of the investment in receivables. The rising trend in these costs would depress the size of investment in receivables.

The firm may follow a lenient or a stringent credit policy. The firm which follows a lenient credit policy sells on credit to customers on very liberal terms and standards. On the contrary a firm following a stringent credit policy sells on credit on a highly selective basis only to those customers who have proper credit worthiness and who are financially sound.

Any increase in accounts receivables that is, additional extension of trade credit not only results in higher sales but also requires additional financing to support the increased investment in accounts receivables. The costs of credit investigations and collection efforts and the chances of bad debts are also increased. On the contrary, a decrease in accounts receivable due to a stringent credit policy may be as a result of reduced sales with competitors offering better credit terms.

18. FACTORS UNDER THE CONTROL OF THE FINANCE MANAGER

The finance manager has operating responsibility for the management of the investment in receivables. His involvement includes:-

- (a) **Supervising** the administration of credit;
- (b) **Contribute** to top management decisions relating to the best credit policies of the firm;
- (c) **Deciding** the criteria for selection of credit applications; and
- (d) **Speed up** the conversion of receivables into cash by aggressive collection policy.

In summary the finance manager has to strike a balance between the cost of increased investment in receivables and profits from the higher levels of sales.



19. APPROACHES TO EVALUATION OF CREDIT POLICIES

There are basically two methods of evaluating the credit policies to be adopted by a Company – Total Approach and Incremental Approach. The formats for the two approaches are given as under:

Statement showing the Evaluation of Credit Policies (based on Total Approach)

<i>Particulars</i>	<i>Present Policy</i>	<i>Proposed Policy I</i>	<i>Proposed Policy II</i>	<i>Proposed Policy III</i>
	₹	₹	₹	₹
A. Expected Profit:				
(a) Credit Sales
(b) Total Cost other than Bad Debts				
(i) Variable Costs
(ii) Fixed Costs

(c) Bad Debts
(d) Cash discount				
(e) Expected Net Profit before Tax (a-b-c-d)
(f) Less: Tax
(g) Expected Profit after Tax
B. Opportunity Cost of Investments in Receivables locked up in Collection Period
Net Benefits (A – B)

Advise: The Policy..... should be adopted since the net benefits under this policy are higher as compared to other policies.

Here

- (i) Total Fixed Cost = [Average Cost per unit – Variable Cost per unit] × No. of units sold on credit under Present Policy
- (ii) Opportunity Cost = Total Cost of Credit Sales × $\frac{\text{Collection period (Days)}}{365 \text{ (or 360)}} \times \frac{\text{Required Rate of Return}}{100}$

Statement showing the Evaluation of Credit Policies (based on Incremental Approach)

<i>Particulars</i>	<i>Present Policy days</i>	<i>Proposed Policy I days</i>	<i>Proposed Policy II days</i>	<i>Proposed Policy III days</i>
	₹	₹	₹	₹
A. Incremental Expected Profit:				
Credit Sales
(a) Incremental Credit Sales
(b) Less: Incremental Costs of Credit Sales				
(i) Variable Costs
(ii) Fixed Costs
(c) Incremental Bad Debt Losses
(d) Incremental Cash Discount
(e) Incremental Expected Profit (a-b-c-d)
(f) Less: Tax
(g) Incremental Expected Profit after Tax

B. Required Return on Incremental Investments:				
(a) Cost of Credit Sales
(b) Collection Period (in days)
(c) Investment in Receivable (a × b/365 or 360)

(d) Incremental Investment in Receivables	.....	.....	.....	.....
(e) Required Rate of Return (in %)	.....	.....	.....	.....
(f) Required Return on Incremental Investments (d × e)	.....	.....	.....	.....
Incremental Net Benefits (A – B)	.....	.....	.....	.....

Advise: The Policyshould be adopted since net benefits under this policy are higher as compared to other policies.

Here:

(i) Total Fixed Cost = [Average Cost per unit – Variable Cost per unit] × No. of units sold on credit under Present Policy

(ii) Opportunity Cost = Total Cost of Credit Sales ×

$$\frac{\text{Collection period (Days)}}{365 \text{ (or 360)}} \times \frac{\text{Required Rate of Return}}{100}$$

ILLUSTRATION 12

A trader whose current sales are in the region of ₹6 lakhs per annum and an average collection period of 30 days wants to pursue a more liberal policy to improve sales. A study made by a management consultant reveals the following information:-

Credit Policy	Increase in collection period	Increase in sales	Present default anticipated
A	10 days	₹30,000	1.5%
B	20 days	₹48,000	2%
C	30 days	₹75,000	3%
D	45 days	₹90,000	4%

The selling price per unit is ₹3. Average cost per unit is ₹2.25 and variable costs per unit are ₹2. The current bad debt loss is 1%. Required return on additional investment is 20%. Assume a 360 days year.

ANALYSE which of the above policies would you recommend for adoption?

SOLUTION**A. Statement showing the Evaluation of Debtors Policies (Total Approach)**

Particulars		Present Policy 30 days	Proposed Policy A 40 days	Proposed Policy B 50 days	Proposed Policy C 60 days	Proposed Policy D 75 days
		₹	₹	₹	₹	₹
A. Expected Profit:						
(a) Credit Sales		6,00,000	6,30,000	6,48,000	6,75,000	6,90,000
(b) Total Cost other than Bad Debts						
(i) Variable Costs [Sales × 2/3]		4,00,000	4,20,000	4,32,000	4,50,000	4,60,000
(ii) Fixed Costs		50,000	50,000	50,000	50,000	50,000
		4,50,000	4,70,000	4,82,000	5,00,000	5,10,000
(c) Bad Debts		6,000	9,450	12,960	20,250	27,600
(d) Expected Profit [(a) – (b) – (c)]		1,44,000	1,50,550	1,53,040	1,54,750	1,52,400
B. Opportunity Cost of Investments in Receivables		7,500	10,444	13,389	16,667	21,250
C. Net Benefits (A – B)		1,36,500	1,40,106	1,39,651	1,38,083	1,31,150

Recommendation: The Proposed Policy A (i.e. increase in collection period by 10 days or total 40 days) should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Notes:

- (i) **Calculation of Fixed Cost** = [Average Cost per unit – Variable Cost per unit] × No. of Units sold
- $$= [₹ 2.25 - ₹ 2.00] \times (₹ 6,00,000/3)$$
- $$= ₹ 0.25 \times 2,00,000 = ₹ 50,000$$

(ii) **Calculation of Opportunity Cost of Average Investments**

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{360} \times \frac{\text{Rate of Return}}{100}$$

$$\text{Present Policy} = 4,50,000 \times \frac{30}{360} \times \frac{20}{100} = 7,500$$

$$\text{Policy A} = 4,70,000 \times \frac{40}{360} \times \frac{20}{100} = 10,444$$

$$\text{Policy B} = 4,82,000 \times \frac{50}{360} \times \frac{20}{100} = 13,389$$

$$\text{Policy C} = 5,00,000 \times \frac{60}{360} \times \frac{20}{100} = 16,667$$

$$\text{Policy D} = 5,10,000 \times \frac{75}{360} \times \frac{20}{100} = 21,250$$

B. Another method of solving the problem is **Incremental Approach**. Here we assume that sales are all credit sales.

Particulars		Present Policy 30 days	Proposed Policy A 40 days	Proposed Policy B 50 days	Proposed Policy C 60 days	Proposed Policy D 75 days
		₹	₹	₹	₹	₹
A.	Incremental Expected Profit:					
	(a) Incremental Credit Sales	---	30,000	48,000	75,000	90,000
	(b) Incremental Costs					
	(i) Variable Costs	---	20,000	32,000	50,000	60,000
	(ii) Fixed Costs	---	-	-	-	-
	(c) Incremental Bad Debt Losses	---	3,450	6,960	14,250	21,600
	(d) Incremental Expected Profit (a – b – c)]		6,550	9,040	10,750	8,400
B.	Required Return on Incremental					

	Investments:					
	(a) Cost of Credit Sales	4,50,000	4,70,000	4,82,000	5,00,000	5,10,000
	(b) Collection period	30	40	50	60	75
	(c) Investment in Receivable (a × b/360)	37,500	52,222	66,944	83,333	1,06,250
	(d) Incremental Investment in Receivables	---	14,722	29,444	45,833	68,750
	(e) Required Rate of Return (in %)		20	20	20	20
	(f) Required Return on Incremental Investments (d × e)	---	2,944	5,889	9,167	13,750
C.	Net Benefits (A – B)	---	3,606	3,151	1,583	- 5,350

Recommendation: The Proposed Policy A should be adopted since the net benefits under this policy are higher than those under other policies.

- C.** Another method of solving the problem is by computing the **Expected Rate of Return**.

$$\text{Expected Rate of Return} = \frac{\text{Incremental Expected Profit}}{\text{Incremental Investment in Receivables}} \times 100$$

$$\text{For Policy A} = \frac{\text{₹ 6,550}}{\text{₹ 14,722}} \times 100 = 44.49\%$$

$$\text{For Policy B} = \frac{\text{₹ 9,040}}{\text{₹ 29,444}} \times 100 = 30.70\%$$

$$\text{For Policy C} = \frac{\text{₹ 10,750}}{\text{₹ 45,833}} \times 100 = 23.45\%$$

$$\text{For Policy D} = \frac{\text{₹ 8,400}}{\text{₹ 68,750}} \times 100 = 12.22\%$$

Recommendation: The Proposed Policy A should be adopted since the Expected Rate of Return (44.49%) is more than the Required Rate of Return (20%) and is highest among the given policies compared.

ILLUSTRATION 13

XYZ Corporation is considering relaxing its present credit policy and is in the process of evaluating two proposed policies. Currently, the firm has annual credit sales of ₹ 50 lakhs and accounts receivable turnover ratio of 4 times a year. The current level of loss due to bad debts is ₹ 1,50,000. The firm is required to give a return of 25% on the investment in new accounts receivables. The company's variable costs are 70% of the selling price. Given the following information, IDENTIFY which is the better option?

(Amount in ₹)

	Present Policy	Policy Option I	Policy Option II
Annual credit sales	50,00,000	60,00,000	67,50,000
Accounts receivable turnover ratio	4 times	3 times	2.4 times
Bad debt losses	1,50,000	3,00,000	4,50,000

SOLUTION

Statement showing the Evaluation of Debtors Policies

Particulars	Present Policy	Proposed Policy I	Proposed Policy II
	₹	₹	₹
A Expected Profit:			
(a) Credit Sales	50,00,000	60,00,000	67,50,000
(b) Total Cost other than Bad Debts:			
(i) Variable Costs	35,00,000	42,00,000	47,25,000
(c) Bad Debts	1,50,000	3,00,000	4,50,000
(d) Expected Profit [(a) – (b) – (c)]	13,50,000	15,00,000	15,75,000

B Opportunity Cost of Investments in Receivables	2,18,750	3,50,000	4,92,188
C Net Benefits (A – B)	11,31,250	11,50,000	10,82,812

Recommendation: The Proposed Policy I should be adopted since the net benefits under this policy are higher as compared to other policies.

Working Note: Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{12} \times \frac{\text{Rate of Return}}{100}$$

Collection Period in months = 12 / Accounts Receivable Turnover Ratio

Present Policy = ₹ 35,00,000 × 3/12 × 25% = ₹ 2,18,750

Proposed Policy I = ₹ 42,00,000 × 4/12 × 25% = ₹ 3,50,000

Proposed Policy II = ₹ 47,25,000 × 5/12 × 25% = ₹ 4,92,188

ILLUSTRATION 14

A company is presently having credit sales of ₹ 12 lakh. The existing credit terms are 1/10, net 45 days and average collection period is 30 days. The current bad debts loss is 1.5%. In order to accelerate the collection process further as also to increase sales, the company is contemplating liberalization of its existing credit terms to 2/10, net 45 days. It is expected that sales are likely to increase by 1/3 of existing sales, bad debts increase to 2% of sales and average collection period to decline to 20 days. The contribution to sales ratio of the company is 22% and opportunity cost of investment in receivables is 15 percent (pre-tax). 50 per cent and 80 percent of customers in terms of sales revenue are expected to avail cash discount under existing and liberalization scheme respectively. The tax rate is 30%.

ADVISE, should the company change its credit terms? (Assume 360 days in a year).

SOLUTION

Working Notes:

(i) Calculation of Cash Discount

Cash Discount = Total credit sales × % of customers who take up discount × Rate

$$\text{Present Policy} = \frac{12,00,000 \times 50 \times 0.01}{100} = ₹ 6,000$$

$$\text{Proposed Policy} = 16,00,000 \times 0.80 \times 0.02 = ₹ 25,600$$

(ii) Opportunity Cost of Investment in Receivables

$$\text{Present Policy} = 9,36,000 \times (30/360) \times (70\% \text{ of } 15)/100 = 78,000 \times 10.5/100 = ₹ 8,190$$

$$\text{Proposed Policy} = 12,48,000 \times (20/360) \times 10.50/100 = ₹ 7,280$$

Statement showing Evaluation of Credit Policies

Particulars	Present Policy	Proposed Policy
Credit Sales	12,00,000	16,00,000
Variable Cost @ 78%* of sales	9,36,000	12,48,000
Bad Debts @ 1.5% and 2%	18,000	32,000
Cash Discount	6,000	25,600
Profit before tax	2,40,000	2,94,400
Tax @ 30%	72,000	88,320
Profit after Tax	1,68,000	2,06,080
Opportunity Cost of Investment in Receivables	8,190	7,280
Net Profit	1,59,810	1,98,800

*Only relevant or variable costs are considered for calculating the opportunity costs on the funds blocked in receivables. Since 22% is contribution, hence the relevant costs are taken to be 78% of the respective sales.

Advise: Proposed policy should be adopted since the net benefit is increased by (₹1,98,800 – ₹1,59,810) ₹ 38,990.

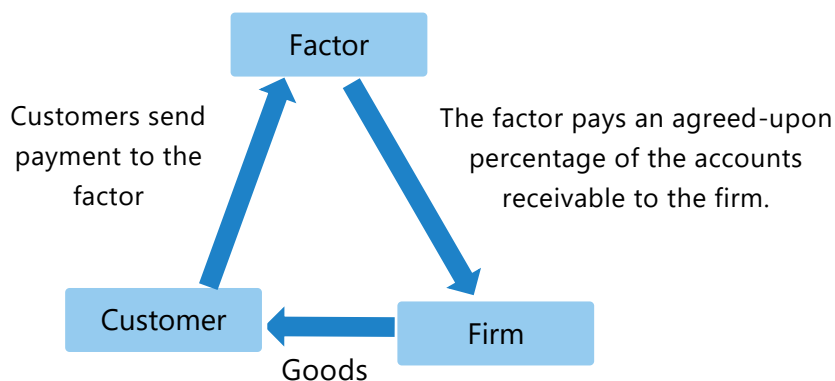


20. FINANCING RECEIVABLES

20.1 Pledging and Factoring

Pledging of accounts receivables and Factoring have emerged as the important sources of financing of accounts receivables now-a-days.

- (i) **Pledging:** This refers to the use of a firm's receivable to secure a short term loan. After cash, a firm's receivables can be termed as its most liquid assets and this serve as prime collateral for a secured loan. The lender scrutinizes the quality of the account receivables, selects acceptable accounts, creates a lien on the collateral and fixes the percentage of financing receivables which ranges around 50 to 90%. The major advantage of pledging accounts receivables is the ease and flexibility it provides to the borrower. Moreover, financing is done regularly. This, however, suffers on account of high cost of financing. Also being a loan, it leaves an impact on the debt equity ratio as well by increasing the amount of debt.
- (ii) **Factoring:** Factoring is a relatively new concept in financing of accounts receivables. This refers to outright sale of accounts receivables to a factor or a financial agency. A factor is a firm that acquires the receivables of other firms. The factoring lays down the conditions of the sale in a factoring agreement. The factoring agency bears the risk of collection and services the accounts for a fee.



Factoring arrangement can be either on a recourse basis or on a non-recourse basis:

- **Recourse:** In case factor is unable to collect the amount from receivables then, factor can turn back the same to the organization for resolution (which generally is by replacing those receivables with new receivables)
- **Non-Recourse:** The factor bears the ultimate risk of loss in case of default and hence in such cases they charge higher commission.

There are a number of financial institutions providing factoring services in India. Some commercial banks and other financial agencies provide this service. The biggest advantages of factoring are the immediate conversion of receivables into cash and predicted pattern of cash flows. Financing receivables with the help of factoring can help a company having liquidity **without creating a net liability on its financial condition** and hence no impact on debt equity ratio. Besides, factoring is a flexible financial tool providing timely funds, efficient record keepings and effective management of the collection process. This is not considered as a loan. There is no debt repayment and hence no compromise to balance sheet, no long-term agreements or delays associated with other methods of raising capital. Factoring allows the firm to use cash for the growth needs of business.

The basic format of evaluating factoring proposal is given as under:

Statement showing the Evaluation of Factoring Proposal

	<i>Particulars</i>	<i>₹</i>
A.	Annual Savings (Benefit) on taking Factoring Service	
	Cost of credit administration saved	.....
	Bad debts avoided	.....
	Interest saved due to reduction in average collection period (Wherever applicable) [Cost of Annual Credit Sales × Rate of Interest × (Present Collection Period – New Collection Period)/360* days]	.....
	Total	.....

B.	Annual Cost of Factoring to the Firm:	
	Factoring Commission [Annual credit Sales × % of Commission (or calculated annually)]	.....
	Interest Charged by Factor on advance (or calculated annually) [Amount available for advance or (Annual Credit Sales – Factoring Commission – Factoring Reserve)] × [$\frac{\text{Collection Period (days)}}{360} \times \text{Rate of Interest}$]	.....
	Total	.....
C.	Net Annual Benefits/Cost of Factoring to the Firm:	A-B
	Rate of Effective Cost of Factoring to the Firm $= \frac{\text{Net Annual cost of Factoring}}{\text{Amount available for advance}} \times 100 \text{ or}$ $= \frac{\text{Net Annual cost of Factoring}}{\text{Advances to be paid}} \times 100$ Advances to be paid = (Amount available for advance – Interest deducted by factor)	

*1 Year is taken as 360 days

Advise:

1. The company should avail Factoring services if rate of effective Cost of Factoring to the firm is less than the existing cost of borrowing or if availing services of factoring results in to positive Net Annual Benefits.
2. The company should not avail Factoring services if the Rate of Effective Cost of Factoring to the Firm is more than the existing cost of borrowing.

ILLUSTRATION 15

A Factoring firm has credit sales of ₹ 360 lakhs and its average collection period is 30 days. The financial controller estimates, bad debt losses are around 2% of credit sales. The firm spends ₹ 1,40,000 annually on debtor's administration. This cost comprises of telephonic and fax bills along with salaries of staff members. These are the avoidable costs. A Factoring firm has offered to buy the firm's receivables. The factor will charge 1% commission and will pay an advance against receivables on an interest @15% p.a. after withholding 10% as reserve. ANALYSE what should the firm do?

Assume 360 days in a year.

SOLUTION**Working notes:**

$$\text{Average level of receivables} = ₹ 360 \text{ lakhs} \times \frac{30}{360} = 30 \text{ lakhs}$$

$$\text{Factoring Commission} = 1\% \text{ of } ₹ 30,00,000 = ₹ 30,000$$

$$\text{Reserve} = 10\% \text{ of } ₹ 30,00,000 = ₹ 3,00,000$$

$$\text{Total (i)} = ₹ 3,30,000$$

Thus, the amount available for advance is

$$\text{Average level of receivables} ₹ 30,00,000$$

$$\text{Less: Total (i) from above} ₹ 3,30,000$$

$$\text{(ii)} ₹ 26,70,000$$

$$\text{Less: Interest @ 15\% p.a. for 30 days} ₹ 33,375$$

$$\text{Net Amount of Advance available.} ₹ 26,36,625$$

Evaluation of Factoring Proposal

	Particulars	₹	₹
A.	Savings (Benefit) to the firm		
	Cost of Credit administration	₹ 1,40,000	₹ 1,40,000
	Cost of bad-debt losses	(0.02 × 360 lakhs)	₹ 7,20,000
	Total		₹ 8,60,000

B.	Cost to the Firm:		
	Factoring Commission [Annual credit Sales × % of Commission (or calculated annually)]	$₹ 30,000 \times \frac{360}{30}$	₹ 3,60,000
	Interest Charges	$₹ 33,375 \times \frac{360}{30}$	₹ 4,00,500
	Total		₹ 7,60,500
C.	Net Benefits to the Firm: (A-B)		₹ 99,500

Advice: Since the savings to the firm exceeds the cost to the firm on account of factoring, therefore, the proposal is acceptable.

20.2 Forfaiting

Meaning of Forfaiting

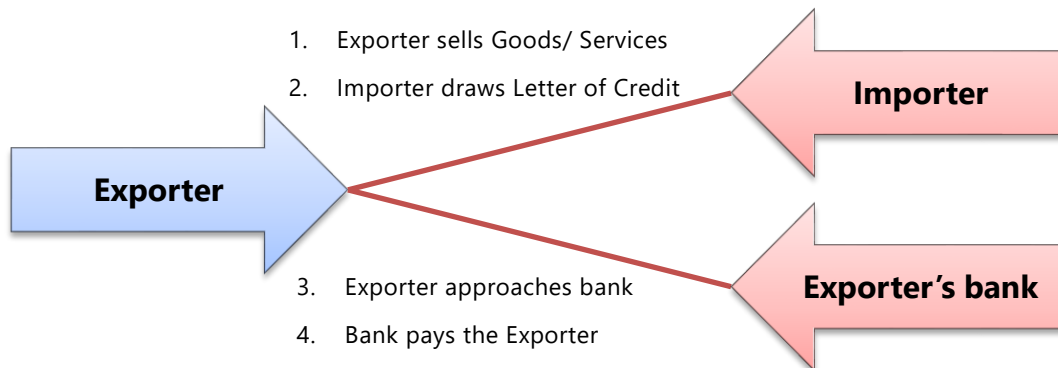
‘Forfait’ is a French term which means “relinquish a right”. Forfaiting is an arrangement of bill discounting in which a financial institution or bank buys the trade bills (invoices) or trade receivables from exporters of goods or services, where the exporter relinquish his right to receive payment from importer. Financial Institutions or banks provides immediate finance to exporter ‘without recourse’ basis in which risk and rewards related with the bills/ receivables transferred to the financial institutions/ banks. It is a unique credit facility arrangement where an overseas buyer (importer) can open a "letter of credit" (or other negotiable instruments) in favour of the exporter and can import goods and services on deferred payment terms.

Functions of Forfaiting

The functionality can be understood in the following manner:

- (i) Exporter sells goods or services to an overseas buyer.
- (ii) The overseas buyers i.e. the importer on the basis trade bills and import documents draws a letter of credit (or other negotiable instruments) through its bank (known as importer’s bank).

- (iii) The exporter on receiving the letter of credit (or other negotiable instruments) approaches to its bank (known as exporter's bank).
- (iv) The exporter's bank buys the letter of credit (or other negotiable instruments) 'without recourse basis' and provides the exporter the payment for the bill.



Features of Forfaiting

The Salient features of forfaiting are:

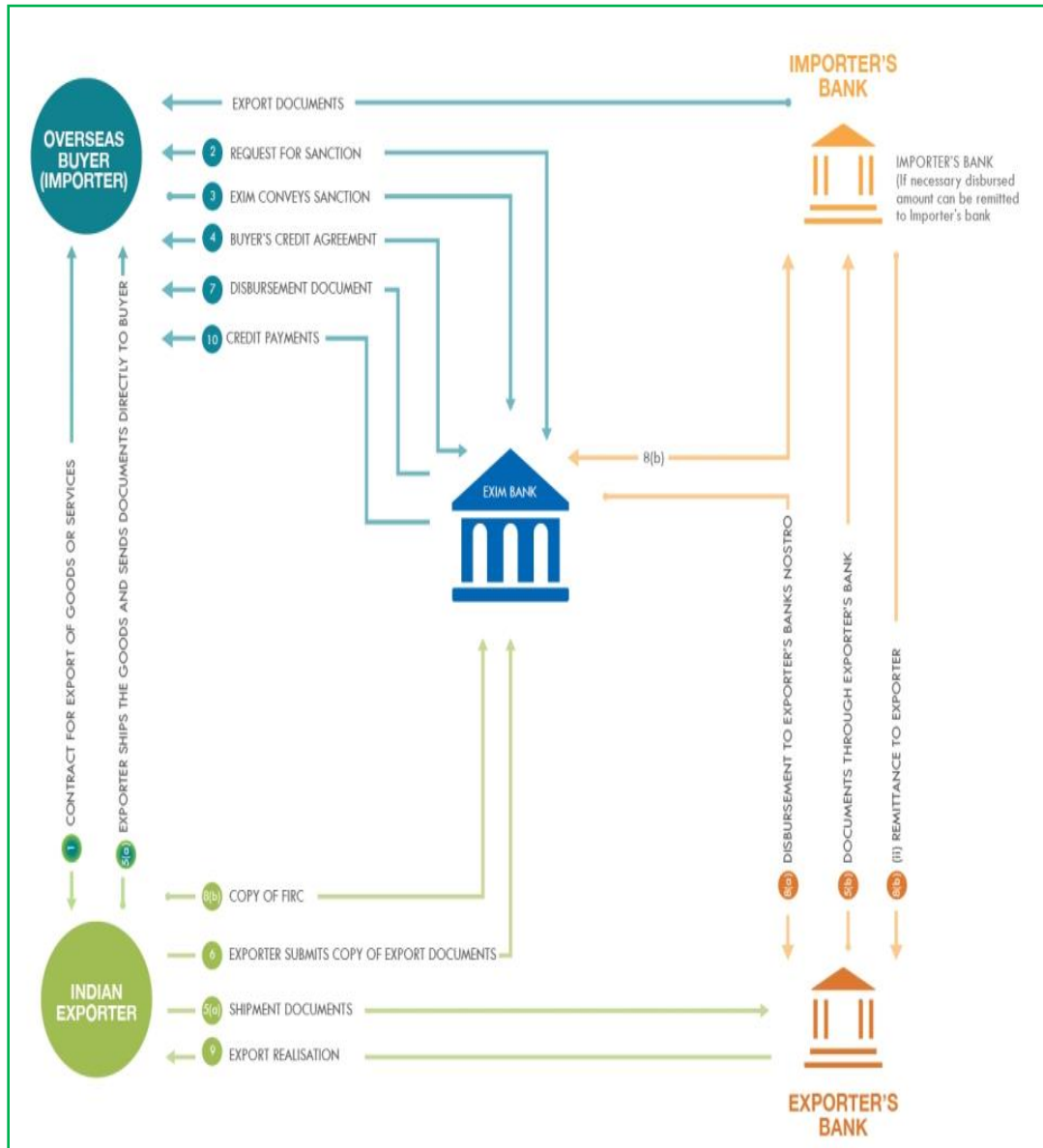
- It motivates exporters to **explore new geographies** as payment is assured.
- An overseas buyer (importer) can import goods and services on **deferred payment terms**.
- The exporter enjoys **reduced transaction costs and complexities** of international trade transactions.
- The exporter gets to **compete in the international market** and can continue to put his working capital to good use to scale up operations.
- While importers avail of forfaiting facility from international financial institutions in order to **finance their imports at competitive rates**.

Example of Forfaiting:

Exim Bank of India's 'Buyer's Credit' is an example of forfaiting arrangement. Buyer's Credit programme facilitates exports for SMEs by providing credit to overseas buyer to import goods from India. It is offering financing of capital goods or services on deferred payment terms and provides non-recourse finance to Indian

exporters by converting deferred credit contract into cash contract. It extends advance payments to Indian exporters on behalf of the overseas buyer.

The following is a diagrammatic illustration of Exim's Buyer's Credit:



(Source: <https://www.eximbankindia.in/buyers-credit>)



21. INNOVATIONS IN RECEIVABLE MANAGEMENT

During the recent years, a number of tools, techniques, practices and measures have been invented to increase effectiveness in accounts receivable management.

Following are the major determinants for significant innovations in accounts receivable management and process efficiency.

1. **Re-engineering Receivable Process:** In some of the organizations real cost reductions and performance improvements have been achieved by re-engineering in accounts receivable process. Re-engineering is a fundamental re-think and re-design of business processes by incorporating modern business approaches. The nature of accounts receivables is such that decisions made elsewhere in the organization are likely to affect the level of resources that are expended on the management of accounts receivables.

The following aspects provide an opportunity to improve the management of accounts receivables:

- (a) **Centralisation:** Centralisation of high nature transactions of accounts receivables and payable is one of the practices for better efficiency. This focuses attention on specialized groups for speedy recovery.
- (b) **Alternative Payment Strategies:** Alternative payment strategies in addition to traditional practices result into efficiencies in the management of accounts receivables. It is observed that payment of accounts outstanding is likely to be quicker where a number of payment alternatives are made available to customers. Besides, this convenient payment method is a marketing tool that is of benefit in attracting and retaining customers. The following alternative modes of payment may also be used along with traditional methods like Cheque Book etc., for making timely payment, added customer service, reducing remittance processing costs and improved cash flows and better debtor turnover.
 - (i) **Direct debit:** I.e., authorization for the transfer of funds from the purchaser's bank account.
 - (ii) **Integrated Voice Response (IVR):** This system uses human operators and a computer-based system to allow customers to

make payment over phone. This system has proved to be beneficial in the organisations processing a large number of payments regularly.

(iii) **Collection by a third party:** The payment can be collected by an authorized external firm. The payments can be made by cash, cheque, credit card or Electronic fund transfer. Banks may also be acting as collecting agents of their customers and directly depositing the collections in customers' bank accounts.

(iv) **Lock Box Processing:** Under this system an outsourced partner captures cheques and invoice data and transmits the file to the client firm for processing in that firm's systems.

(v) **Payments via Internet using fund transfer methods** like RTGS, NEFT, IPMS UPIs, App based payment like Paytm, Phone Pe, etc.

(c) **Customer Orientation:** Where individual customers or a group of customers have some strategic importance to the firm a case study approach may be followed to develop good customer relations. A critical study of this group may lead to formation of a strategy for prompt settlement of debt.

2. **Evaluation of Risk:** Risk evaluation is a major component in the establishment of an effective control mechanism. Once risks have been properly assessed controls can be introduced to either contain the risk to an acceptable level or to eliminate them entirely. This also provides an opportunity for removing inefficient practices. This involves a re-think of processes and questioning the way that tasks are performed. This also opens the way for efficiency and effectiveness benefits in the management of accounts receivables.

3. **Use of Latest Technology:** Technological developments now-a-days provides an opportunity for improvement in accounts receivables process. The major innovations available are the integration of systems used in the management of accounts receivables, the automation and the use of e-commerce.

- (a) **E-commerce** refers to the use of computer and electronic telecommunication technologies, particularly on an inter-organisational level, to support trading in goods and services. It uses technologies such as Electronic Data Inter-change (EDI), Electronic Mail, Electronic Funds Transfer (EFT) and Electronic Catalogue Systems to allow the buyer and seller to transact business by exchange of information between computer application systems such as Amazon, Flipkart etc.
 - (b) **Automated Accounts Receivable Management Systems:** Now-a-days all the big companies develop and maintain automated receivable management systems. Manual systems of recording the transactions and managing receivables are not only cumbersome but ultimately costly also. These integrated systems automatically update all the accounting records affected by a transaction. For example, if a transaction of credit sale is to be recorded, the system increases the amount the customer owes to the firm, reduces the inventory for the item purchased, and records the sale. This system of a company allows the application and tracking of receivables and collections, using the automated receivables system allows the company to store important information for an unlimited number of customers and transactions, and accommodate efficient processing of customer payments and adjustments.
4. **Receivable Collection Practices:** The aim of debtors' collection should be to reduce, monitor and control the accounts receivable at the same time maintain customer goodwill. The fundamental rule of sound receivable management should be to reduce the time lag between the sale and collection. Any delays that lengthen this span causes receivables to unnecessary build up and increase the risk of bad debts. This is equally true for the delays caused by billing and collection procedures as it is for delays caused by the customer.

The following are major receivable collection procedures and practices:

- (i) Issue of Invoice.
- (ii) Open account or open-end credit.

- (iii) Credit terms or time limits.
- (iv) Periodic statements and follow ups.
- (v) Use of payment incentives and penalties.
- (vi) Record keeping and Continuous Audit.
- (vii) Export Factoring: Factors provide comprehensive credit management, loss protection collection services and provision of working capital to the firms exporting internationally.
- (viii) Business Process Outsourcing: This refers to a strategic business tool whereby an outside agency takes over the entire responsibility for managing a business process like collections in this case.

5. Use of Financial tools/techniques: The finance manager while managing accounts receivables uses a number of financial tools and techniques. Some of them have been described hereby as follows:

- (i) **Credit analysis:** While determining the credit terms, the firm has to evaluate individual customers in respect of their credit worthiness and the possibility of bad debts. For this purpose, the firm has to ascertain credit rating of prospective customers.

Credit rating: An important task for the finance manager is to rate the various debtors who seek credit facility. This involves decisions regarding individual parties so as to ascertain how much credit can be extended and for how long. In foreign countries specialized agencies are engaged in the task of providing rating information regarding individual parties. Dun and Broad street is one such source.

The finance manager has to look into the credit-worthiness of a party and sanction credit limit only after he is convinced that the party is sound. This would involve an analysis of the financial status of the party, its reputation and previous record of meeting commitments.

The credit manager here has to employ a number of sources to obtain credit information. The following are the important sources:

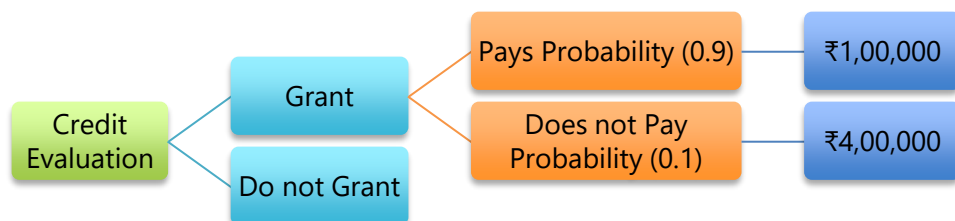
Trade references; Bank references; Credit bureau reports; Past experience; Published financial statements; and Salesman's interview and reports.

Once the credit-worthiness of a client is ascertained, the next question is to set a limit of the credit. This credit limit once set can be further enhanced as the favorable experience is gained while dealing with that client. In all such enquiries, the credit manager must be discreet and should always have the interest of high sales in view at the same time balancing any risk of non-collection.

- (ii) **Credit Granting - Decision tree analysis:** The decision whether to grant credit or not is a decision involving costs and benefits. When a customer pays, the seller makes profit but when he fails to pay the amount of cost going into the product is also gone. If the relative chances of recovering the dues can be decided, it can form a probability distribution of payment or non-payment. If the chances of recovery are 9 out of 10 then probability of recovery is 0.9 and that of default is 0.1.

Credit evaluation of a customer shows that the probability of recovery is 0.9 and that of default is 0.1, the revenue from the order is ₹ 5 lakhs and cost is ₹ 4 lakhs. The decision is whether credit should be granted or not.

The analysis is presented in the following diagram.



The weighted net benefit is ₹ $[1,00,000 \times 0.9 \text{ i.e. } 90,000 - 0.1 \times 4,00,000 \text{ i.e. } 40,000]$ = 50,000. So, credit should be granted.

- (iii) **Control of receivables:** Another aspect of management of debtors is the control of receivables. Merely setting of standards and framing a credit policy

is not sufficient; it is, equally important to control receivables by constant monitoring and follow ups.

- (iv) **Collection policy:** Efficient and timely collection of debtors ensures that the bad debt losses are reduced to the minimum and the average collection period is shorter. If a firm spends more resources on collection of debts, it is likely to have smaller bad debts. Thus, a firm must work out the optimum amount that it should spend on collection of debtors. This involves a trade-off between the level of expenditure on the one hand and decrease in bad debt losses and investment in debtors on the other.

The collection cell of a firm has to work in a manner that it does not create too much resentment amongst the customers. On the other hand, it has to keep the amount of the outstanding in check. Hence, it has to work in a very smoothen manner and diplomatically.

It is important that clear-cut procedures regarding credit collection are set up. Such procedures must answer questions like the following:

- (a) How long should a debtor balance be allowed to exist before collection process is started?
- (b) What should be the procedure of follow up with defaulting customer? How reminders are to be sent and how should and at what frequency, each successive reminder be drafted?
- (c) Should there be collection machinery whereby personal calls by company's representatives are made?
- (d) What should be the procedure for dealing with doubtful accounts? Is legal action to be instituted or some escalation matrix to be followed? How should account be handled?



22. MONITORING OF RECEIVABLES

Constant monitoring of the current status of receivables is very essential for any organization to make sure that its receivables management is as effective as it should be. Various steps that constitute constant monitoring are:

- (i) **Computation of average age of receivables:** It involves **computation of average collection period.**

- (ii) **Ageing Schedule:** When receivables are analysed according to their age, the process is known as preparing the ageing schedules of receivables. The computation of average age of receivables is a quick and effective method of comparing the liquidity of receivables with the liquidity of receivables in the past and also comparing liquidity of one firm with the liquidity of the other competitive firm. It also helps the firm to predict collection pattern of receivables in future. This comparison can be made periodically.

The purpose of classifying receivables by age groups is to have a closer control over the quality of individual accounts. It requires going back to the receivables' ledger where the dates of each customer's purchases and payments are available. The ageing schedule, by indicating a tendency for old accounts to accumulate, provides a useful supplement to average collection period of receivables/sales analysis. Because an analysis of receivables in terms of associated dates of sales enables the firm to recognise the recent increases, and slumps in sales. To ascertain the condition of receivables for control purposes, it may be considered desirable to compare the current ageing schedule with an earlier ageing schedule in the same firm and also to compare this information with the experience of other firms. The following is an illustration of the ageing schedule of receivables:-

Ageing Schedule

Age Classes (Days)	As on 30 th June, 2022			As on 30 th September, 2022		
	Month of Sale	Balance of Receivables	Percentage to total	Month of Sale	Balance of Receivables	Percentage to total
		(₹)			(₹)	
1-30	June	41,500	11.9	September	1,00,000	22.7
31-60	May	74,200	21.4	August	2,50,000	56.8
61-90	April	1,85,600	53.4	July	48,000	10.9
91-120	March	35,300	10.2	June	40,000	9.1
121 and more	Earlier	<u>10,800</u>	<u>3.1</u>	Earlier	<u>2,000</u>	<u>0.5</u>
		<u>3,47,400</u>	<u>100</u>		<u>4,40,000</u>	<u>100</u>

The above ageing schedule shows a substantial improvement in the liquidity of receivables for the quarter ending September, 2022 as compared with the liquidity of receivables for the quarter ending June, 2022. It could be possible due to greater collection efforts of the firm.

(iii) Debt Collection Programme:

- (a) **Monitoring** the state of receivables.
- (b) **Intimation** to customers when due date approaches.
- (c) **E-mail and telephonic** advice to customers on the due date.
- (d) **Reminding** the legal recourse on overdue A/cs and follow escalation matrix if available.
- (e) **Legal action** on overdue A/cs.

The following diagram shows the relationship between collection expenses and bad debt losses which have to be established as initial increase in collection expenses may have only a small impact on bad debt losses.



ILLUSTRATION 16

Mosaic Limited has current sales of ₹ 15 lakhs per year. Cost of sales is 75 per cent of sales and bad debts are one per cent of sales. Cost of sales comprises 80 per cent variable costs and 20 per cent fixed costs, while the company's required rate of return is 12 per cent. Mosaic Limited currently allows customers 30 days' credit, but is considering increasing this to 60 days' credit in order to increase sales.

It has been estimated that this change in policy will increase sales by 15 per cent, while bad debts will increase from one per cent to four per cent. It is not expected that the policy change will result in an increase in fixed costs and creditors and stock will be unchanged. Should Mosaic Limited introduce the proposed policy? ANALYSE (Assume a 360 days year)

SOLUTION

New level of sales will be $15,00,000 \times 1.15 = ₹ 17,25,000$

Variable costs are $80\% \times 75\% = 60\%$ of sales

Contribution from sales is therefore 40% of sales

Fixed Cost are $20\% \times 75\% = 15\%$ of sales

Particulars	₹	₹
Proposed investment in debtors = Variable Cost + Fixed Cost* $= (17,25,000 \times 60\%) + (15,00,000 \times 15\%)$ $= (10,35,000 + 2,25,000) \times \frac{60}{360}$		2,10,000
Current investment in debtors = $[(15,00,000 \times 60\%) + (15,00,000 \times 15\%)] \times \frac{30}{360}$		<u>93,750</u>
Increase in investment in debtors		<u>1,16,250</u>
Increase in contribution = $15\% \times 15,00,000 \times 40\%$		90,000
New level of bad debts = $(17,25,000 \times 4\%)$	69,000	
Current level of bad debts $(15,00,000 \times 1\%)$	<u>15,000</u>	
Increase in bad debts		(54,000)
Additional financing costs = $1,16,250 \times 12\% =$		<u>(13,950)</u>
Savings by introducing change in policy		<u>22,050</u>

* Fixed Cost is taken at existing level in case of proposed investment as well

Advise: Mosaic Limited should introduce the proposed policy.

UNIT - V

MANAGEMENT OF PAYABLES (CREDITORS)

23. INTRODUCTION

There is an old age saying in business that if you can buy well then you can sell well. Management of your creditors and suppliers is just as important as the management of your debtors.

Trade creditor is a spontaneous / short term source of finance in the sense that it arises from ordinary business transaction. But it is also important to look after your creditors - slow payment by you may create ill-feeling and your supplies could be disrupted and also create a bad image for your company.

Creditors are a vital part of effective cash management and should be managed carefully to enhance the cash position.

24. COST AND BENEFITS OF TRADE CREDIT

(a) Cost of Availing Trade Credit

Normally it is considered that the trade credit does not carry any cost. However, it carries the following costs:

- (i) **Price:** There is often a discount on the price that the firm undergoes when it uses trade credit, since it can take advantage of the discount only if it pays immediately. This discount can translate into a high implicit cost.
- (ii) **Loss of goodwill:** If the credit is overstepped, suppliers may discriminate against delinquent customers if supplies become short. As with the effect of any loss of goodwill, it depends very much on the relative market strengths of the parties involved.
- (iii) **Cost of managing:** Management of creditors involves administrative and accounting costs that would otherwise be incurred.
- (iv) **Conditions:** Sometimes most of the suppliers insist that for availing the credit facility the order should be of some minimum size or even on regular basis.

(b) Cost of Not Taking Trade Credit

On the other hand, the costs of not availing credit facilities are as under:

- (i) **Impact of Inflation:** If inflation persists then the borrowers are favored over the lenders as they were better off to pay the fixed outstanding amount later than sooner. Also, the subsequent transactions shall be at higher prices.
- (ii) **Interest:** Trade credit is a type of interest free loan, therefore failure to avail this facility has an interest cost. This cost is further increased if interest rates are higher.
- (iii) **Inconvenience:** Sometimes it may also cause inconvenience to the supplier if the supplier is geared to the deferred payment.

**25. COMPUTATION OF COST OF PAYABLES**

By using the trade credit judiciously, a firm can reduce the effect of growth or burden on investments in Working Capital.

Now question arises how to calculate the cost of not taking the discount.

The following equation can be used to calculate nominal cost, on an annual basis of not taking the discount:

$$\frac{d}{100-d} \times \frac{365 \text{ days}}{t}$$

However, the above formula does not take into account the compounding effect and therefore, the cost of credit shall be even higher. The cost of lost cash discount can be estimated by the formula:

$$\left(\frac{100}{100-d} \right)^{\frac{365}{t}} - 1$$

Where,

d = Size of discount i.e. for 6% discount, d = 6

t = The reduction in the payment period in days, necessary to obtain the early discount or Days Credit Outstanding – Discount Period.

ILLUSTRATION 17

Suppose ABC Ltd. has been offered credit terms from its major supplier of 2/10, net 45. Hence the company has the choice of paying ₹ 10 per ₹ 100 or to invest ₹ 98 for an additional 35 days and eventually pay the supplier ₹ 100 per ₹ 100. The decision as to whether the discount should be accepted depends on the opportunity cost of investing ₹ 98 for 35 days. ANALYSE what should the company do?

SOLUTION

If the company does not avail the cash discount and pays the amount after 45 days, the implied cost of interest per annum would be approximately:

$$\left(\frac{100}{100-2} \right)^{\frac{365}{35}} - 1 = 23.5\%$$

Now let us assume that ABC Ltd. can invest the additional cash and can obtain an annual return of 25% and if the amount of invoice is ₹ 10,000. The alternatives are as follows:

	Refuse discount	Accept discount
	₹	₹
Payment to supplier	10,000	9,800
Return from investing ₹ 9,800 between day 10 and day 45: $\frac{35}{365} \times ₹ 9,800 \times 25\%$	(235)	
Net Cost	9,765	9,800

Advise: Thus, it is better for the company to refuse the discount, as return on cash retained is more than the saving on account of discount.

ILLUSTRATION 18

The Dolce Company purchases raw materials on terms of 2/10, net 30. A review of the company's records by the owner, Mr. Gautam, revealed that payments are usually made 15 days after purchases are made. When asked why the firm did not take advantage of its discounts, the accountant, Mr. Rohit, replied that it cost only 2 per cent for these funds, whereas a bank loan would cost the company 12 per cent.

- (a) *ANALYSE what mistake is Rohit making?*
- (b) *If the firm could not borrow from the bank and was forced to resort to the use of trade credit funds, what suggestion might be made to Rohit that would reduce the annual interest cost? IDENTIFY.*

SOLUTION

- (a) Rohit's argument of comparing 2% discount with 12% bank loan rate is not rational as 2% discount can be earned by making payment 5 days in advance i.e. within 10 days rather 15 days as payments are made presently. Whereas 12% bank loan rate is for a year.

Assume that the purchase value is ₹100, the discount can be earned by making payment within 10 days is ₹2, therefore, net payment would be ₹98 only. Annualized benefit

$$= \frac{₹2}{₹98} \times \frac{365 \text{ days}}{5 \text{ days}} \times 100 = 149\%$$

This means cost of not taking cash discount is 149%.

- (b) If the bank loan facility could not be available, then in this case the company should resort to utilise maximum credit period as possible.

Therefore, payment should be made in 30 days to reduce the interest cost.

UNIT - VI

FINANCING OF WORKING CAPITAL



26. INTRODUCTION

After determining the amount of working capital required, the next step to be taken by the finance manager is to arrange the funds.

As discussed earlier, it is advisable that the finance manager bifurcate the working capital requirements between the permanent working capital and temporary working capital.

The permanent working capital is always needed irrespective of sales fluctuation; hence it should be financed by the long-term sources such as debt and equity. On the contrary the temporary working capital may be financed by the short-term sources of finance.

Broadly speaking, the working capital finance may be classified between the two categories:

- (i) Spontaneous sources; and
- (ii) Negotiable sources.

Spontaneous Sources: Spontaneous sources of finance are those which naturally arise in the course of business operations. Trade credit, credit from employees, credit from suppliers of services, etc. are some of the examples which may be quoted in this respect.

Negotiated Sources: On the other hand, the negotiated sources, as the name implies, are those which have to be specifically negotiated with lenders say, commercial banks, financial institutions, general public etc.

The finance manager has to be very careful while selecting a particular source, or a combination thereof for financing of working capital. Generally, the following parameters will guide his decisions in this respect:

- (i) Cost factor
- (ii) Impact on credit rating

- (iii) Feasibility
- (iv) Reliability
- (v) Restrictions
- (vi) Hedging approach or matching approach i.e., Financing of assets with the same maturity as of assets.

27. SOURCES OF FINANCE

27.1 Spontaneous Sources of Finance

(a) Trade Credit: As outlined above trade credit is a spontaneous source of finance which is normally extended to the purchaser organization by the sellers or services providers. This source of financing working capital is more important since it contributes to about one-third of the total short-term requirements. The dependence on this source is higher due to lesser cost of finance as compared with other sources. Trade credit is guaranteed when a company acquires supplies, merchandise or materials and does not pay immediately. If a buyer is able to get the credit without completing much formality, it is termed as 'open account trade credit.'

(b) Bills Payable: On the other hand, in the case of "Bills Payable" the purchaser will have to give a written promise to pay the amount of the bill/invoice either on demand or at a fixed future date to the seller or the bearer of the note.

Due to its simplicity, easy availability and lesser explicit cost, the dependence on this source is much more in all small or big organizations. Especially, for small enterprises this form of credit is more helpful to small and medium enterprises. The amount of such financing depends on the volume of purchases and the payment timing.

(c) Accrued Expenses: Another spontaneous source of short-term financing is the accrued expenses or the outstanding expenses liabilities. The accrued expenses refer to the services availed by the firm, but the payment for which has yet to be made. It is a built in and an automatic source of finance as most of the services like wages, salaries, taxes, duties etc., are paid at the end of the period. The accrued

expenses represent an interest free source of finance. There is no explicit or implicit cost associated with the accrued expenses and the firm can ensure liquidity by accruing these expenses.

27.2 Inter-corporate Loans and Deposits

Sometimes, organizations having surplus funds invest for short-term period with other organizations. The rate of interest will be higher than the bank rate of interest and depends on the financial soundness of the borrower company. This source of finance reduces dependence on bank financing.

27.3 Commercial Papers

Commercial Paper (CP) is an unsecured promissory note issued by a firm to raise funds for a short period. This is an instrument that enables highly rated corporate borrowers for short-term borrowings and provides an additional financial instrument to investors with a freely negotiable interest rate. The maturity period ranges from minimum 7 days to less than 1 year from the date of issue. CP can be issued in denomination of ₹ 5 lakhs or multiples thereof.

Advantages of CP: From the point of the issuing company, CP provides the following benefits:

- (a) CP is sold on an unsecured basis and does not contain any restrictive conditions.
- (b) Maturing CP can be repaid by selling new CP and thus can provide a continuous source of funds.
- (c) Maturity of CP can be tailored to suit the requirement of the issuing firm.
- (d) CP can be issued as a source of fund even when money market is tight.
- (e) Generally, the cost of CP to the issuing firm is lower than the cost of commercial bank loans.

However, CP as a source of financing has its own limitations:

- (i) Only highly credit rating firms can use it. New and moderately rated firm generally are not in a position to issue CP.

- (ii) CP can neither be redeemed before maturity nor can be extended beyond maturity.

27.4 Funds Generated from Operations

Funds generated from operations, during an accounting period, increase working capital by an equivalent amount. The two main components of funds generated from operations are profit and depreciation. Working capital will increase by the extent of funds generated from operations. Students may refer to funds flow statement given earlier in this chapter.

27.5 Public Deposits

Deposits from the public are one of the important sources of finance particularly for well-established big companies with huge capital base for short and medium-term.

27.6 Bills Discounting

Bill discounting is recognized as an important short-term Financial Instrument and it is widely used method of short-term financing. In a process of bill discounting, the supplier of goods draws a bill of exchange with direction to the buyer to pay a certain amount of money after a certain period, and gets its acceptance from the buyer or drawee of the bill.

27.7 Bill Rediscounting Scheme

The Bill rediscounting Scheme was introduced by Reserve Bank of India with effect from 1st November, 1970 in order to extend the use of the bill of exchange as an instrument for providing credit and the creation of a bill market in India with a facility for the rediscounting of eligible bills by banks. Under the bills rediscounting scheme, all licensed scheduled banks are eligible to offer bills of exchange to the Reserve Bank for rediscount.

27.8 Factoring

Students may refer to the unit on Receivable Management wherein the concept of factoring has been discussed. Factoring is a method of financing whereby a firm

sells its trade debts at a discount to a financial institution. In other words, factoring is a continuous arrangement between a financial institution, (namely the factor) and a firm (namely the client) which sells goods and services to trade customers on credit. As per this arrangement, the factor purchases the client's trade debts including accounts receivables either with or without recourse to the client, and thus, exercises control over the credit extended to the customers and administers the sales ledger of his client. To put it in a layman's language, a factor is an agent who collects the dues of his client for a certain fee.

The differences between Factoring and Bills discounting are as follows:

- (i) Factoring is called as 'Invoice factoring' whereas bills discounting is known as "Invoice discounting".
- (ii) In factoring the parties are known as client, factor and debtor whereas in bills discounting they are known as Drawer, Drawee and Payee.
- (iii) Factoring is a sort of management of book debts whereas bills discounting is a sort of borrowing from commercial banks.
- (iv) For factoring there is no specific Act; whereas in the case of bills discounting, the Negotiable Instrument Act is applicable.

28. WORKING CAPITAL FINANCE FROM BANKS

Banks in India today constitute the major suppliers of working capital credit to any business activity. Recently, some term lending financial institutions have also announced schemes for working capital financing. The two committees viz., Tandon Committee and Chore Committee have evolved definite guidelines and parameters in working capital financing, which have laid the foundations for development and innovation in the area.

28.1 Instructions on Working Capital Finance by Banks

Assessment of Working Capital

- Reserve Bank of India has withdrawn the prescription, in regard to assessment of working capital needs, based on the concept of Maximum Permissible Bank Finance (MPBF), in April 1997. Banks are now free to evolve, with the approval

of their Boards, methods for assessing the working capital requirements of borrowers, within the prudential guidelines and exposure norms prescribed. Banks, however, have to take into account Reserve Bank's instructions relating to directed credit (such as priority sector, export, etc.), and prohibition of credit (such as bridge finance, rediscounting of bills earlier discounted by NBFCs) while formulating their lending policies.

- With the above liberalizations, all the instructions relating to MPBF issued by RBI from time to time stand withdrawn. Further, various instructions/guidelines issued to banks with objective of ensuring lending discipline in appraisal, sanction, monitoring and utilization of bank finance cease to be mandatory. However, banks have the option of incorporating such of the instructions/guidelines as are considered necessary in their lending policies/procedures.

29. FORMS OF BANK CREDIT

The bank credit will generally be in the following forms:

- **Cash Credit:** This facility will be given by the banker to the customers by giving certain amount of credit facility on continuous basis. The borrower will not be allowed to exceed the limits sanctioned by the bank.
- **Bank Overdraft:** It is a short-term borrowing facility made available to the companies in case of urgent need of funds. The banks will impose limits on the amount they can lend. When the borrowed funds are no longer required they can quickly and easily be repaid. The banks issue overdrafts with a right to call them in at short notice.
- **Bills Discounting:** The Company which sells goods on credit will normally draw a bill on the buyer who will accept it and sends it to the seller of goods. The seller, in turn discounts the bill with his banker. The banker will generally earmark the discounting bill limit.
- **Bills Acceptance:** To obtain finance under this type of arrangement a company draws a bill of exchange on bank. The bank accepts the bill thereby promising to pay out the amount of the bill at some specified future date.

- **Line of Credit:** Line of Credit is a commitment by a bank to lend a certain amount of funds on demand specifying the maximum amount.
- **Letter of Credit:** It is an arrangement by which the issuing bank on the instructions of a customer or on its own behalf undertakes to pay or accept or negotiate or authorizes another bank to do so against stipulated documents subject to compliance with specified terms and conditions.
- **Bank Guarantees:** Bank guarantee is one of the facilities that the commercial banks extend on behalf of their clients in favour of third parties who will be the beneficiaries of the guarantees.

SUMMARY

- ◆ Working Capital Management involves managing the balance between firm's short-term assets and its short-term liabilities.
- ◆ From the value point of view, Working Capital can be defined as Gross Working Capital or Net Working Capital.
- ◆ From the point of view of time, the term working capital can be divided into two categories viz., Permanent and temporary.
- ◆ A large amount of working capital would mean that the company has idle funds. Since funds have a cost, the company has to pay huge amount as interest on such funds. If the firm has inadequate working capital, such firm runs the risk of insolvency.
- ◆ Some of the items/factors which need to be considered while planning for working capital requirement are nature of business, market and demand conditions, operating efficiency, credit policy etc.
- ◆ Finance manager has to pay particular attention to the levels of current assets and their financing. To decide the levels and financing of current assets, the risk return trade off must be taken into account.
- ◆ In determining the optimum level of current assets, the firm should balance the profitability – Solvency tangle by minimizing total costs.

- ◆ Working Capital cycle indicates the length of time between a company's paying for materials, entering into stock and receiving the cash from sales of finished goods. It can be determined by adding the number of days required for each stage in the cycle.
- ◆ Treasury management is defined as 'the corporate handling of all financial matters, the generation of external and internal funds for business, the management of currencies and cash flows and the complex, strategies, policies and procedures of corporate finance.
- ◆ The main objectives of cash management for a business are:-
 - (a) Provide adequate cash to each of its units;
 - (b) No funds are blocked in idle cash; and
 - (c) The surplus cash (if any) should be invested in order to maximize returns for the business.
- ◆ Large amounts are tied up in sundry debtors, there are chances of bad debts and there will be cost of collection of debts. On the contrary, if the investment in sundry debtors is low, the sales may be restricted, since the competitors may offer more liberal terms. Therefore, management of sundry debtors is an important issue and requires proper policies and their implementation.
- ◆ There are basically three aspects of management of sundry debtors: Credit policy, Credit Analysis and Control of receivables.
- ◆ Trade creditor is a spontaneous source of finance in the sense that it arises from ordinary business transaction. But it is also important to look after your creditors - slow payment by you may create ill-feeling and your supplies could be disrupted and also create a bad image for your company.
- ◆ It is advisable that the finance manager bifurcates the working capital requirements between the permanent working capital and temporary working capital.
- ◆ The permanent working capital is always needed irrespective of sales fluctuations, hence should be financed by the long-term sources such as debt and equity. On the contrary the temporary working capital may be financed by the short-term sources of finance.

TEST YOUR KNOWLEDGE

Multiple Choice Questions (MCQs)

1. *The credit terms may be expressed as "3/15 net 60". This means that a 3% discount will be granted if the customer pays within 15 days, if he does not avail the offer, he must make payment within 60 days.*
 - (a) *I agree with the statement*
 - (b) *I do not agree with the statement*
 - (c) *I cannot say.*
2. *The term 'net 50' implies that the customer will make payment:*
 - (a) *Exactly on 50th day*
 - (b) *Before 50th day*
 - (c) *Not later than 50th day*
 - (d) *None of the above.*
3. *Trade credit is a source of :*
 - (a) *Long-term finance*
 - (b) *Medium term finance*
 - (c) *Spontaneous source of finance*
 - (d) *None of the above.*
4. *The term float is used in:*
 - (a) *Inventory Management*
 - (b) *Receivable Management*
 - (c) *Cash Management*
 - (d) *Marketable securities.*
5. *William J Baumol's model of Cash Management determines optimum cash level where the carrying cost and transaction cost are:*
 - (a) *Maximum*

- (b) *Minimum*
 - (c) *Medium*
 - (d) *None of the above.*
6. *In Miller – ORR Model of Cash Management:*
- (a) *The lower, upper limit, and return point of Cash Balances are set out*
 - (b) *Only upper limit and return point are decided*
 - (c) *Only lower limit and return point are decided*
 - (d) *None of the above are decided.*
7. *Working Capital is defined as:*
- (a) *Excess of current assets over current liabilities*
 - (b) *Excess of current liabilities over current assets*
 - (c) *Excess of Fixed Assets over long-term liabilities*
 - (d) *None of the above.*
8. *Working Capital is also known as "Circulating Capital, fluctuating Capital and revolving capital". The aforesaid statement is;*
- (a) *Correct*
 - (b) *Incorrect*
 - (c) *Cannot say.*
9. *The basic objectives of Working Capital Management are:*
- (a) *Optimum utilization of resources for profitability*
 - (b) *To meet day-to-day current obligations*
 - (c) *Ensuring marginal return on current assets is always more than cost of capital*
 - (d) *Select any one of the above statements.*
10. *The term Gross Working Capital is known as:*
- (a) *The investment in current liabilities*

- (b) *The investment in long-term liability*
 - (c) *The investment in current assets*
 - (d) *None of the above.*
11. *The term net working capital refers to the difference between the current assets minus current liabilities.*
- (a) *The statement is correct*
 - (b) *The statement is incorrect*
 - (c) *I cannot say.*
12. *The term "Core current assets" was coined by:*
- (a) *Chore Committee*
 - (b) *Tandon Committee*
 - (c) *Jilani Committee*
 - (d) *None of the above.*
13. *The concept operating cycle refers to the average time which elapses between the acquisition of raw materials and the final cash realization. This statement is:*
- (a) *Correct*
 - (b) *Incorrect*
 - (c) *Partially True*
 - (d) *I cannot say.*
14. *As a matter of self-imposed financial discipline can there be a situation of zero working capital now-a-days in some of the professionally managed organizations.*
- (a) *Yes*
 - (b) *No*
 - (c) *Impossible*
 - (d) *Cannot say.*

15. *Over trading arises when a business expands beyond the level of funds available. The statement is:*
- (a) *Incorrect*
 - (b) *Correct*
 - (c) *Partially correct*
 - (d) *I cannot say.*
16. *A Conservative Working Capital strategy calls for high levels of current assets in relation to sales.*
- (a) *I agree*
 - (b) *Do not agree*
 - (c) *I cannot say.*
17. *The term Working Capital leverage refer to the impact of level of working capital on company's profitability. This measures the responsiveness of ROCE for changes in current assets.*
- (a) *I agree*
 - (b) *Do not agree*
 - (c) *The statement is partially true.*
18. *The term spontaneous source of finance refers to the finance which naturally arise in the course of business operations. The statement is:*
- (a) *Correct*
 - (b) *Incorrect*
 - (c) *Partially Correct*
 - (d) *I cannot say.*
19. *Under hedging approach to financing of working capital requirements of a firm, each asset in the balance sheet assets side would be offset with a financing instrument of the same approximate maturity. This statement is:*
- (a) *Incorrect*

- (b) *Correct*
 - (c) *Partially correct*
 - (d) *I cannot say.*
20. *Trade credit is a:*
- (a) *Negotiated source of finance*
 - (b) *Hybrid source of finance*
 - (c) *Spontaneous source of finance*
 - (d) *None of the above.*
21. *Factoring is a method of financing whereby a firm sells its trade debts at a discount to a financial institution. The statement is:*
- (a) *Correct*
 - (b) *Incorrect*
 - (c) *Partially correct*
 - (d) *I cannot say.*
22. *A factoring arrangement can be both with recourse as well as without recourse:*
- (a) *True*
 - (b) *False*
 - (c) *Partially correct*
 - (d) *Cannot say.*
23. *The Bank financing of working capital will generally be in the following form. Cash Credit, Overdraft, bills discounting, bills acceptance, line of credit; Letter of credit and bank guarantee.*
- (a) *I agree*
 - (b) *I do not agree*
 - (c) *I cannot say.*

24. *When the items of inventory are classified according to value of usage, the technique is known as:*
- (a) *XYZ Analysis*
 - (b) *ABC Analysis*
 - (c) *DEF Analysis*
 - (d) *None of the above.*
25. *When a firm advises its customers to mail their payments to special Post Office collection centers, the system is known as.*
- (a) *Concentration banking*
 - (b) *Lock Box system*
 - (c) *Playing the float*
 - (d) *None of the above.*

Theoretical Questions

1. *DISCUSS the factors to be taken into consideration while determining the requirement of working capital.*
2. *DISCUSS the liquidity vs. profitability issue in management of working capital.*
3. *DISCUSS the estimation of working capital need based on operating cycle process.*
4. *EXPLAIN briefly the functions of Treasury Department.*
5. *EXPLAIN Baumol's Model of Cash Management.*
6. *STATE the advantage of Electronic Cash Management System.*
7. *EXPLAIN with example the formula used for determining optimum cash balance according to Baumol's cash management model.*
8. *DISCUSS Miller-Orr Cash Management model.*
9. *EXPLAIN briefly the accounts receivable systems.*
10. *DESCRIBE Factoring.*

11. DESCRIBE the various forms of bank credit in financing the working capital of a business organization.

Practical Problems

1. Following information is forecasted by R Limited for the year ending 31st March, 2022:

	Balance as at 31 st March, 2022	Balance as at 31 st March, 2021
	(₹ in lakh)	(₹ in lakh)
Raw Material	65	45
Work-in-progress	51	35
Finished goods	70	60
Receivables	135	112
Payables	71	68
Annual purchases of raw material (all credit)	400	
Annual cost of production	450	
Annual cost of goods sold	525	
Annual operating cost	325	
Annual sales (all credit)	585	

You may take one year as equal to 365 days.

You are required to CALCULATE:

- (i) Net operating cycle period.
 - (ii) Number of operating cycles in the year.
 - (iii) Amount of working capital requirement.
2. The following data relating to an auto component manufacturing company is available for the year 2021-22:

Raw material held in storage

20 days

<i>Receivables' collection period</i>	<i>30 days</i>
<i>Conversion process period</i>	<i>10 days</i>
<i>(raw material – 100%, other costs – 50% complete)</i>	
<i>Finished goods storage period</i>	<i>45 days</i>
<i>Credit period from suppliers</i>	<i>60 days</i>
<i>Advance payment to suppliers</i>	<i>5 days</i>
<i>Total cash operating expenses per annum</i>	<i>₹ 800 lakhs</i>
<i>75% of the total cash operating expenses are for raw material. 360 days are assumed in a year.</i>	

You are required to CALCULATE:

- (i) Each item of current assets and current liabilities,*
- (ii) The working capital requirement, if the company wants to maintain a cash balance of ₹ 10 lakhs at all times.*

3. *The following figures and ratios are related to a company:*

<i>(i) Sales for the year (all credit)</i>	<i>₹ 90,00,000</i>
<i>(ii) Gross Profit ratio</i>	<i>35 percent</i>
<i>(iii) Fixed assets turnover (based on cost of goods sold)</i>	<i>1.5</i>
<i>(iv) Stock turnover (based on cost of goods sold)</i>	<i>6</i>
<i>(v) Liquid ratio</i>	<i>1.5:1</i>
<i>(vi) Current ratio</i>	<i>2.5:1</i>
<i>(vii) Receivables (Debtors) collection period</i>	<i>1 month</i>
<i>(viii) Reserves and surplus to Share capital</i>	<i>1:1.5</i>
<i>(ix) Capital gearing ratio</i>	<i>0.7875</i>
<i>(x) Fixed assets to net worth</i>	<i>1.3 : 1</i>

You are required to PREPARE:

- (a) Balance Sheet of the company on the basis of above details.*

- (b) The statement showing working capital requirement, if the company wants to make a provision for contingencies @15 percent of net working capital.
4. PQ Ltd., a company newly commencing business in 2021-22 has the following projected Profit and Loss Account:

	(₹)	(₹)
Sales		2,10,000
Cost of goods sold		<u>1,53,000</u>
Gross Profit		57,000
Administrative Expenses	14,000	
Selling Expenses	<u>13,000</u>	<u>27,000</u>
Profit before tax		30,000
Provision for taxation		<u>10,000</u>
Profit after tax		<u>20,000</u>
The cost of goods sold has been arrived at as under:		
Materials used	84,000	
Wages and manufacturing Expenses	62,500	
Depreciation	<u>23,500</u>	
	1,70,000	
Less: Stock of Finished goods		
(10% of goods produced not yet sold)	<u>17,000</u>	
		<u>1,53,000</u>

The figure given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock.

All expenses will be paid one month in advance. Suppliers of materials will extend 1-1/2 months credit. Sales will be 20% for cash and the rest at two months' credit. 70% of the Income tax will be paid in advance in quarterly instalments. The company wishes to keep ₹ 8,000 in cash. 10% has to be added to the estimated figure for unforeseen contingencies.

PREPARE an estimate of working capital.

Note: All workings should form part of the answer.

5. *M.A. Limited is commencing a new project for manufacture of a plastic component. The following cost information has been ascertained for annual production of 12,000 units which is the full capacity:*

	Costs per unit (₹)
<i>Materials</i>	40.00
<i>Direct labour and variable expenses</i>	20.00
<i>Fixed manufacturing expenses</i>	6.00
<i>Depreciation</i>	10.00
<i>Fixed administration expenses</i>	4.00
	80.00

The selling price per unit is expected to be ₹ 96 and the selling expenses ₹ 5 per unit, 80% of which is variable.

In the first two years of operations, production and sales are expected to be as follows:

Year	Production (No. of units)	Sales (No. of units)
1	6,000	5,000
2	9,000	8,500

To assess the working capital requirements, the following additional information is available:

- (a) *Stock of materials* 2.25 months' average consumption
 (b) *Work-in-process* Nil

- (c) Debtors 1 month's average sales.
 (d) Cash balance ₹ 10,000
 (e) Creditors for supply of materials 1 month's average purchase during the year.
 (f) Creditors for expenses 1 month's average of all expenses during the year.

PREPARE, for the two years:

- (i) A projected statement of Profit/Loss (Ignoring taxation); and
 (ii) A projected statement of working capital requirements.
6. Aneja Limited, a newly formed company, has applied to a commercial bank for the first time for financing its working capital requirements. The following information is available about the projections for the current year:

Estimated level of activity: 1,04,000 completed units of production plus 4,000 units of work-in-progress. Based on the above activity, estimated cost per unit is:

Raw material	₹ 80 per unit
Direct wages	₹ 30 per unit
Overheads (exclusive of depreciation)	<u>₹ 60 per unit</u>
Total cost	<u>₹ 170 per unit</u>
Selling price	<u>₹ 200 per unit</u>

Raw materials in stock: Average 4 weeks consumption, work-in-progress (assume 50% completion stage in respect of conversion cost) (materials issued at the start of the processing).

Finished goods in stock	8,000 units
Credit allowed by suppliers	Average 4 weeks
Credit allowed to debtors/receivables	Average 8 weeks
Lag in payment of wages	Average 1.5 weeks

Cash at banks (for smooth operation) is expected to be ₹ 25,000.

Assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only.

You are required to **CALCULATE** the net working capital required.

7. The management of Trux Company Ltd. is planning to expand its business and consults you to prepare an estimated working capital statement. The records of the company reveals the following annual information:

	(₹)
Sales – Domestic at one month's credit	18,00,000
Export at three month's credit (sales price 10% below domestic price)	8,10,000
Materials used (suppliers extend two months credit)	6,75,000
Lag in payment of wages – ½ month	5,40,000
Lag in payment of manufacturing expenses (cash) – 1 month	7,65,000
Lag in payment of Administration Expenses – 1 month	1,80,000
Selling expenses payable quarterly in advance	1,12,500
Income tax payable in four installments, of which one falls in the next financial year	1,68,000

Rate of gross profit is 20%. Ignore work-in-progress and depreciation.

The company keeps one month's stock of raw materials and finished goods (each) and believes in keeping ₹ 2,50,000 available to it including the overdraft limit of ₹ 75,000 not yet utilized by the company.

The management is also of the opinion to make 10% margin for contingencies on computed figure.

You are required to **PREPARE** the estimated working capital statement for the next year.

8. The following information relates to Zeta Limited, a publishing company:

The selling price of a book is ₹ 15, and sales are made on credit through a book club and invoiced on the last day of the month.

Variable costs of production per book are materials (₹ 5), labour (₹ 4), and overhead (₹ 2)

The sales manager has forecasted the following volumes:

Month	No. of Books
November	1,000
December	1,000
January	1,000
February	1,250
March	1,500
April	2,000
May	1,900
June	2,200
July	2,200
August	2,300

Customers are expected to pay as follows:

One month after the sale	40%
Two months after the sale	60%

The company produces the books two months before they are sold and the creditors for materials are paid two months after production.

Variable overheads are paid in the month following production and are expected to increase by 25% in April; 75% of wages are paid in the month of production and 25% in the following month. A wage increase of 12.5% will take place on 1st March.

The company is going through a restructuring and will sell one of its freehold properties in May for ₹25,000, but it is also planning to buy a new printing press in May for ₹10,000. Depreciation is currently ₹1,000 per month, and will rise to ₹1,500 after the purchase of the new machine.

The company's corporation tax (of ₹10,000) is due for payment in March.

The company presently has a cash balance at bank on 31 December 2021, of ₹1,500.

You are required to PREPARE a cash budget for the six months from January to June, 2022.

9. From the information and the assumption that the cash balance in hand on 1st January 2022 is ₹ 72,500, PREPARE a cash budget.

Assume that 50 per cent of total sales are cash sales. Assets are to be acquired in the months of February and April. Therefore, provisions should be made for the payment of ₹ 8,000 and ₹ 25,000 for the same. An application has been made to the bank for the grant of a loan of ₹ 30,000 and it is hoped that the loan amount will be received in the month of May.

It is anticipated that a dividend of ₹ 35,000 will be paid in June. Debtors are allowed one month's credit. Creditors for materials purchased and overheads grant one month's credit. Sales commission at 3 per cent on sales is paid to the salesman each month.

Month	Sales (₹)	Materials Purchases (₹)	Salaries & Wages (₹)	Production Overheads (₹)	Office and Selling Overheads (₹)
January	72,000	25,000	10,000	6,000	5,500
February	97,000	31,000	12,100	6,300	6,700
March	86,000	25,500	10,600	6,000	7,500
April	88,600	30,600	25,000	6,500	8,900
May	1,02,500	37,000	22,000	8,000	11,000
June	1,08,700	38,800	23,000	8,200	11,500

10. Consider the balance sheet of Maya Limited as on 31 December, 2022. The company has received a large order and anticipates the need to go to its bank to increase its borrowings. As a result, it has to forecast its cash requirements for January, February and March, 2023. Typically, the company collects 20 per cent of its sales in the month of sale, 70 per cent in the subsequent month, and 10 per cent in the second month after the sale. All sales are credit sales.

Equity & liabilities	Amount (₹ in '000)	Assets	Amount (₹ in '000)
Equity shares capital	100	Net fixed assets	1,836
Retained earnings	1,439	Inventories	545
Long-term borrowings	450	Accounts receivables	530

Accounts payables	360	Cash and bank	50
Loan from banks	400		
Other liabilities	212		
	2,961		2,961

Purchases of raw materials are made in the month prior to the sale and amounts to 60 per cent of sales. Payments for these purchases occur in the month after the purchase. Labour costs, including overtime, are expected to be ₹ 1,50,000 in January, ₹ 2,00,000 in February, and ₹ 1,60,000 in March. Selling, administrative, taxes, and other cash expenses are expected to be ₹ 1,00,000 per month for January through March. Actual sales in November and December and projected sales for January through April are as follows (in thousands):

Month	₹	Month	₹	Month	₹
November	500	January	600	March	650
December	600	February	1,000	April	750

On the basis of this information:

- (a) PREPARE a cash budget and DETERMINE the amount of additional bank borrowings necessary to maintain a cash balance of ₹ 50,000 at all times for the months of January, February, and March.
 - (b) PREPARE a pro forma balance sheet for March 31.
11. PQR Ltd. having an annual sales of ₹ 30 lakhs, is re-considering its present collection policy. At present, the average collection period is 50 days and the bad debt losses are 5% of sales. The company is incurring an expenditure of ₹ 30,000 on account of collection of receivables. Cost of funds is 10 percent.

The alternative policies are as under:

	Alternative I	Alternative II
Average Collection Period	40 days	30 days
Bad Debt Losses	4% of sales	3% of sales
Collection Expenses	₹ 60,000	₹ 95,000

DETERMINE the alternatives on the basis of incremental approach and state which alternative is more beneficial.

12. As a part of the strategy to increase sales and profits, the sales manager of a company proposes to sell goods to a group of new customers with 10% risk of non-payment. This group would require one and a half months credit and is likely to increase sales by ₹ 1,00,000 p.a. Production and Selling expenses amount to 80% of sales and the income-tax rate is 50%. The company's minimum required rate of return (after tax) is 25%.

Should the sales manager's proposal be accepted? ANALYSE

Also COMPUTE the degree of risk of non-payment that the company should be willing to assume if the required rate of return (after tax) were (i) 30%, (ii) 40% and (iii) 60%.

13. Slow Payers are regular customers of Goods Dealers Ltd. and have approached the sellers for extension of credit facility for enabling them to purchase goods. On an analysis of past performance and on the basis of information supplied, the following pattern of payment schedule emerges in regard to Slow Payers:

Pattern of Payment Schedule	
At the end of 30 days	15% of the bill
At the end of 60 days	34% of the bill
At the end of 90 days	30% of the bill
At the end of 100 days	20% of the bill
Non-recovery	1% of the bill

Slow Payers want to enter into a firm commitment for purchase of goods of ₹ 15 lakhs in 2021-22, deliveries to be made in equal quantities on the first day of each quarter in the calendar year. The price per unit of commodity is ₹ 150 on which a profit of ₹ 5 per unit is expected to be made. It is anticipated by Goods Dealers Ltd., that taking up of this contract would mean an extra recurring expenditure of ₹ 5,000 per annum. If the opportunity cost of funds in the hands of Goods Dealers is 24% per annum, would you as the finance manager of the seller recommend the grant of credit to Slow Payers? ANALYSE. Workings should form part of your answer. Assume year of 365 days.

14. PREPARE a working capital estimate to finance an activity level of 52,000 units a year (52 weeks) based on the following data:

Raw Materials	- ₹ 400 per unit
Direct Wages	- ₹ 150 per unit

Overheads (Manufacturing) - ₹200 per unit

Overheads (Selling & Distribution) - ₹100 per unit

Selling Price - ₹1,000 per unit, Raw materials & Finished Goods remain in stock for 4 weeks, Work in process takes 4 weeks. Debtors are allowed 8 weeks for payment whereas creditors allow us 4 weeks. Finished goods are valued at cost of sales.

Minimum cash balance expected is ₹50,000. Receivables are valued at Selling Price.

Case Scenarios

1. ArMore LLP is a newly established startup dealing in manufacture of a revolutionary product HDHMR which is a substitute to conventional wood and plywood. It is an economical substitute for manufacture of furniture and home furnishing. It has been asked by a venture capitalist for an estimated amount of funds required for setting up plant and also the amount of circulating capital required. A consultant hired by the entity has advised that the cost of setting up the plant would be ₹5 Crores and it will require 1 year to make the plant operational. The anticipated revenue and associated cost numbers are as follows:

Units to be sold = 3 lakh sq metres p.a.

Sale Price of each sq mtr = ₹1000

Raw Material cost = ₹200 per sq mtr

Labour cost = ₹50 per hour

Labour hours per sq mtr = 3 hours

Cash Manufacturing Overheads = ₹75 per machine hour

Machine hours per sq mtr = 2 hours

Selling and credit administration Overheads = ₹250 per sq mtr

Being a new product in the industry, the firm will have to give a longer credit period of 3 months to its customers. It will maintain a stock of raw material equal to 15% of annual consumption. Based on negotiation with the creditors, the payment period has been agreed to be 1 month from the date of purchase. The entity will hold finished goods equal to 2 months of units to be sold. All

other expenses are to be paid one month in arrears. Cash and Bank balance to the tune of ₹ 25,00,000 is required to be maintained.

The entity is also considering reducing the working capital requirement by either of the two options: a) reducing the credit period to customers by a month which will lead to reduction in sales by 5%. b) Engaging with a factor for managing the receivables, who will charge a commission of 2% of invoice value and will also advance 65% of receivables @ 12% p.a. This will lead to savings in administration and bad debts cost to the extent of ₹ 20 lakhs and 16 lakhs respectively.

The entity is also considering funding a part of working capital by bank loan. For this purpose, bank has stipulated that it will grant 75% of net current assets as advance against working capital. The bank has quoted 16.5% rate of interest with a condition of opening a current account with it, which will require 10% of loan amount to be minimum average balance.

You being an finance manager, has been asked the following questions:

- (i) The anticipated profit before tax per annum after the plant is operational is*
 - (a) ₹ 750 Lakhs*
 - (b) ₹ 570 Lakhs*
 - (c) ₹ 370 Lakhs*
 - (d) ₹ 525 Lakhs*
- (ii) The estimated current assets requirement in the first year of operation (debtors calculated at cost) is*
 - (a) ₹ 9,42,50,000*
 - (b) ₹ 2,17,08,333*
 - (c) ₹ 7,25,41,667*
 - (d) ₹ 67,08,333*
- (iii) The net working capital requirement for the first year of operation is*
 - (a) ₹ 9,42,50,000*
 - (b) ₹ 2,17,08,333*
 - (c) ₹ 7,25,41,667*
 - (d) ₹ 67,08,333*

- (iv) *The annualised % cost of two options for reducing the working capital is*
- (a) 18.18% and 16.92%
 - (b) 18.33% and 16.92%
 - (c) 18.59% and 18.33%
 - (d) 16.92% and 19.05%
- (v) *What will be the Maximum Permissible Bank Finance by the bank and annualised % cost of the same?*
- (a) ₹4,55,03,630 and 18.33%
 - (b) ₹5,44,06,250 and 18.33%
 - (c) ₹4,45,86,025 and 18.59%
 - (d) ₹3,45,89,020 and 19.85%

ANSWERS/SOLUTIONS

Answers to the MCQs

1.	(a)	2.	(c)	3.	(c)	4.	(c)	5.	(b)	6.	(a)
7.	(a)	8.	(a)	9.	(b)	10.	(c)	11.	(a)	12.	(b)
13.	(a)	14.	(a)	15.	(b)	16.	(a)	17.	(a)	18.	(a)
19.	(b)	20.	(c)	21.	(a)	22.	(a)	23.	(a)	24.	(b)
25.	(b)										

Answers to the Theoretical Questions

1. Please refer paragraph 9.3
2. Please refer paragraph 9.4.1
3. Please refer paragraph 9.5
4. Please refer paragraph 9.8
5. Please refer paragraph 9.11.1
6. Please refer paragraph 9.12.6

7. Please refer paragraph 9.11.1
8. Please refer paragraph 9.11.2
9. Please refer paragraph 9.21
10. Please refer paragraph 9.20
11. Please refer paragraph 9.29

Answers to the Practical Problems

1. Working Notes:

1. Raw Material Storage Period (R)

$$= \frac{\text{Average Stock of Raw Material}}{\text{Annual Consumption of Raw Material}} \times 365$$

$$= \frac{\frac{₹45 + ₹65}{2}}{₹380} \times 365 = 52.83 \text{ or } 53 \text{ days}$$

Annual Consumption of Raw Material = Opening Stock + Purchases - Closing Stock

$$= ₹45 + ₹400 - ₹65 = ₹380 \text{ lakh}$$

2. Work – in - Progress (WIP) Conversion Period (W)

$$= \frac{\text{Average Stock of WIP}}{\text{Annual Cost of Production}} \times 365$$

$$= \frac{\frac{₹35 + ₹51}{2}}{₹450} \times 365 = 34.87 \text{ or } 35 \text{ days}$$

3. Finished Stock Storage Period (F)

$$= \frac{\text{Average Stock of Finished Goods}}{\text{Cost of Goods Sold}} \times 365$$

$$= \frac{\frac{₹60 + ₹70}{2}}{₹525} \times 365 = 45.19 \text{ or } 45 \text{ days.}$$

4. **Receivables (Debtors) Collection Period (D)**

$$= \frac{\text{Average Receivables}}{\text{Annual Credit Sales}} \times 365$$

$$= \frac{\frac{₹112 + ₹135}{2}}{₹585} \times 365 = 77.05 \text{ or } 77 \text{ days}$$

5. **Payables (Creditors) Payment Period (C)**

$$= \frac{\text{Average Payables for materials}}{\text{Annual Credit purchases}} \times 365$$

$$= \frac{\frac{₹68 + ₹71}{2}}{₹400} \times 365 = 63.41 \text{ or } 64 \text{ days}$$

(i) **Net Operating Cycle Period**

$$= R + W + F + D - C$$

$$= 53 + 35 + 45 + 77 - 64 = 146 \text{ days}$$

(ii) **Number of Operating Cycles in the Year**

$$= \frac{365}{\text{Operating Cycle Period}} = \frac{365}{146} = 2.5 \text{ times}$$

(iii) **Amount of Working Capital Required**

$$= \frac{\text{Annual Operating Cost}}{\text{Number of Operating Cycles}} = \frac{₹ 325}{2.50} = ₹ 130 \text{ lakh}$$

2. Since WIP is 100% complete in terms of material and 50% complete in terms of other cost, the same has been considered for number of days for WIP inventory i.e. 10 days for material and 5 days for other costs respectively.

Particulars	For Raw Material	For Other Costs	Total
Cash Operating expenses	$\frac{75}{100} \times 800 = 600$	$\frac{25}{100} \times 800 = 200$	800.00
Raw Material Stock Holding	$\frac{20}{360} \times 600 = 33.33$	-	33.33

WIP Conversion	$\frac{10}{360} \times 600 = 16.67$	$\frac{5}{360} \times 200 = 2.78$	19.45
Finished Goods Stock Holding	$\frac{45}{360} \times 600 = 75$	$\frac{45}{360} \times 200 = 25$	100.00
Receivable Collection Period	$\frac{30}{360} \times 600 = 50$	$\frac{30}{360} \times 200 = 16.67$	66.67
Advance to suppliers	$\frac{5}{360} \times 600 = 8.33$	-	8.33
Credit Period from suppliers	$\frac{60}{360} \times 600 = 100$	-	100.00

Computation of working capital

	₹ in lakhs
Raw Material Stock	33.33
WIP	19.45
Finished Goods stock	100.00
Receivables	66.67
Advance to Suppliers	8.33
Cash	10.00
	237.78
Less: Payables (Creditors)	100.00
Working capital	133.78

3. Working Notes:

- (i) Cost of Goods Sold = Sales – Gross Profit (35% of Sales)
= ₹ 90,00,000 – ₹ 31,50,000
= ₹ 58,50,000
- (ii) Closing Stock = Cost of Goods Sold / Stock Turnover
= ₹ 58,50,000/6 = ₹ 9,75,000

$$\begin{aligned}
 \text{(iii) Fixed Assets} &= \text{Cost of Goods Sold} / \text{Fixed Assets Turnover} \\
 &= ₹ 58,50,000 / 1.5 \\
 &= ₹ 39,00,000
 \end{aligned}$$

(iv) Current Assets and Current Liabilities

Current Ratio = 2.5 and Liquid Ratio = 1.5

$$\text{CA} / \text{CL} = 2.5 \quad \dots \text{(i)}$$

$$(\text{CA} - \text{Inventories}) / \text{CL} = 1.5 \quad \dots \text{(ii)}$$

By subtracting equation (ii) from (i), we get,

$$\text{Inventories} / \text{CL} = 1$$

$$\text{Current Liabilities} = \text{Inventories (stock)} = ₹ 9,75,000$$

$$\therefore \text{Current Assets} = ₹ 9,75,000 \times 2.5 = ₹ 24,37,500$$

Or

Current Ratio / Quick Ratio = Current Assets / Quick Assets

$$2.5 / 1.5 = \text{Current Assets} / (\text{Current Assets} - \text{Inventory})$$

$$2.5/1.5 \text{ Current Assets} - 2.5/1.5 \times ₹ 9,75,000 = \text{Current Assets}$$

$$\text{Hence, Current Assets} = ₹ 24,37,500$$

(v) Liquid Assets (Receivables and Cash)

$$= \text{Current Assets} - \text{Inventories (Stock)}$$

$$= ₹ 24,37,500 - ₹ 9,75,000$$

$$= ₹ 14,62,500$$

(vi) Receivables (Debtors) = Sales × Debtors Collection period / 12

$$= ₹ 90,00,000 \times 1/12$$

$$= ₹ 7,50,000$$

(vii) Cash = Liquid Assets – Receivables (Debtors)

$$= ₹ 14,62,500 - ₹ 7,50,000 = ₹ 7,12,500$$

(viii) Net worth = Fixed Assets / 1.3

$$= ₹ 39,00,000 / 1.3 = ₹ 30,00,000$$

(ix) Reserves and Surplus

Reserves and Surplus / Share Capital = 1/1.5

Share Capital = 1.5 Reserves and Surplus ... (i)

Now, Reserves and Surplus + Share Capital = Net worth ... (ii)

From (i) and (ii), we get,

2.5 Reserves and Surplus = Net worth

Reserves and Surplus = ₹ 30,00,000 / 2.5 = ₹ 12,00,000

(x) Share Capital = Net worth – Reserves and Surplus

= ₹ 30,00,000 – ₹ 12,00,000

= ₹ 18,00,000

(xi) Long-term Debts

Capital Gearing Ratio = Long-term Debts / Equity Shareholders' Fund

Long-term Debts = ₹ 30,00,000 × 0.7875 = ₹ 23,62,500

(a) Balance Sheet of the Company

Particulars	Figures as the end of 31-03-2021 (₹)	Figures as the end of 31-03-2020 (₹)
I. EQUITY AND LIABILITIES		
Shareholders' funds		
(a) Share capital	18,00,000	-
(b) Reserves and surplus	12,00,000	-
Non-current liabilities		
(a) Long-term borrowings	23,62,500	-
Current liabilities	9,75,000	-
TOTAL	63,37,500	-
II. ASSETS		
Non-current assets		
Fixed assets	39,00,000	-

Current assets		
Inventories	9,75,000	-
Trade receivables	7,50,000	-
Cash and cash equivalents	7,12,500	-
TOTAL	63,37,500	-

(b) Statement Showing Working Capital Requirement

	(₹)	(₹)
A. Current Assets		
(i) Inventories (Stocks)		9,75,000
(ii) Receivables (Debtors)		7,50,000
(iii) Cash in hand & at bank		7,12,500
Total Current Assets		24,37,500
B. Current Liabilities:		
Total Current Liabilities		9,75,000
Net Working Capital (A – B)		14,62,500
Add: Provision for contingencies (15% of Net Working Capital)		2,19,375
Working capital requirement		16,81,875

4. Statement showing the requirements of Working Capital

Particulars	(₹)	(₹)
A. Current Assets:		
Inventory:		
Stock of Raw material (₹ 96,600 × 2/12)	16,100	
Stock of Work-in-progress (As per Working Note)	16,350	
Stock of Finished goods (₹ 1,46,500 × 10/100)	14,650	
Receivables (Debtors) (₹1,27,080 × 2/12)	21,180	
Cash in Hand	8,000	
Prepaid Expenses:		

Wages & Mfg. Expenses ($\text{₹ } 66,250 \times 1/12$)	5,521	
Administrative expenses ($\text{₹ } 14,000 \times 1/12$)	1,167	
Selling & Distribution Expenses ($\text{₹ } 13,000 \times 1/12$)	1,083	
Advance taxes paid $\{(70\% \text{ of } \text{₹ } 10,000) \times 3/12\}$	1,750	
Gross Working Capital	85,801	85,801
B. Current Liabilities:		
Payables for Raw materials ($\text{₹ } 1,12,700 \times 1.5/12$)	14,088	
Provision for Taxation (Net of Advance Tax) ($\text{₹ } 10,000 \times 30/100$)	3,000	
Total Current Liabilities	17,088	17,088
C. Excess of CA over CL		68,713
Add: 10% for unforeseen contingencies		6,871
Net Working Capital requirements		75,584

Working Notes:**(i) Calculation of Stock of Work-in-progress**

Particulars	(₹)
Raw Material ($\text{₹ } 84,000 \times 15\%$)	12,600
Wages & Mfg. Expenses ($\text{₹ } 62,500 \times 15\% \times 40\%$)	3,750
Total	16,350

(ii) Calculation of Stock of Finished Goods and Cost of Sales

Particulars	(₹)
Direct material Cost [$\text{₹ } 84,000 + \text{₹ } 12,600$]	96,600
Wages & Mfg. Expenses [$\text{₹ } 62,500 + \text{₹ } 3,750$]	66,250
Depreciation	0
Gross Factory Cost	1,62,850
Less: Closing W.I.P	(16,350)
Cost of goods produced	1,46,500

Add: Administrative Expenses	14,000
	1,60,500
Less: Closing stock	(14,650)
Cost of Goods Sold	1,45,850
Add: Selling and Distribution Expenses	13,000
Total Cash Cost of Sales	1,58,850
Debtors (80% of cash cost of sales)	1,27,080

(iii) Calculation of Credit Purchase

Particulars	(₹)
Raw material consumed	96,600
Add: Closing Stock	16,100
Less: Opening Stock	-
Purchases	1,12,700

5. (i)

M.A. Limited
Projected Statement of Profit / Loss
(Ignoring Taxation)

	Year 1	Year 2
Production (Units)	6,000	9,000
Sales (Units)	5,000	8,500
	(₹)	(₹)
Sales revenue (A) (Sales unit × ₹ 96)	4,80,000	8,16,000
Cost of production:		
Materials cost (Units produced × ₹ 40)	2,40,000	3,60,000
Direct labour and variable expenses (Units produced × ₹ 20)	1,20,000	1,80,000
Fixed manufacturing expenses (Production Capacity: 12,000 units × ₹ 6)	72,000	72,000
Depreciation	1,20,000	1,20,000

(Production Capacity : 12,000 units × ₹ 10)		
Fixed administration expenses (Production Capacity : 12,000 units × ₹ 4)	48,000	48,000
Total Costs of Production	6,00,000	7,80,000
Add: Opening stock of finished goods (Year 1 : Nil; Year 2 : 1,000 units)	---	1,00,000
Cost of Goods available for sale (Year 1: 6,000 units; Year 2: 10,000 units)	6,00,000	8,80,000
Less: Closing stock of finished goods at average cost (year 1: 1000 units, year 2 : 1500 units) (Cost of Production × Closing stock/ units produced)	(1,00,000)	(1,32,000)
Cost of Goods Sold	5,00,000	7,48,000
Add: Selling expenses – Variable (Sales unit × ₹ 4)	20,000	34,000
Add: Selling expenses -Fixed (12,000 units × ₹ 1)	12,000	12,000
Cost of Sales : (B)	5,32,000	7,94,000
Profit (+) / Loss (-): (A - B)	(-) 52,000	(+) 22,000

Note: Value of closing stock valued at average cost of goods available for sale.

Working Notes:

1. Calculation of creditors for supply of materials:

	Year 1 (₹)	Year 2 (₹)
Materials consumed during the year	2,40,000	3,60,000
Add: Closing stock (2.25 month's average consumption)	45,000	67,500
	2,85,000	4,27,500
Less: Opening Stock	---	45,000
Purchases during the year	2,85,000	3,82,500

Average purchases per month (Creditors)	23,750	31,875
---	--------	--------

2. Creditors for expenses:

	Year 1 (₹)	Year 2 (₹)
Direct labour and variable expenses	1,20,000	1,80,000
Fixed manufacturing expenses	72,000	72,000
Fixed administration expenses	48,000	48,000
Selling expenses (variable + fixed)	32,000	46,000
Total (including	2,72,000	3,46,000
Average per month	22,667	28,833

(ii) Projected Statement of Working Capital requirements

	Year 1 (₹)	Year 2 (₹)
Current Assets:		
Inventories:		
- Stock of materials (2.25 month's average consumption)	45,000	67,500
- Finished goods	1,00,000	1,32,000
Debtors (1 month's average sales) (including profit)	40,000	68,000
Cash	10,000	10,000
Total Current Assets/ Gross working capital (A)	1,95,000	2,77,500
Current Liabilities:		
Creditors for supply of materials (Refer to working note 1)	23,750	31,875
Creditors for expenses (Refer to working note 2)	22,667	28,833
Total Current Liabilities: (B)	46,417	60,708
Estimated Working Capital Requirements: (A-B)	1,48,583	2,16,792

**Projected Statement of Working Capital Requirement
(Cash Cost Basis)**

	Year 1 (₹)	Year 2 (₹)
(A) Current Assets		
Inventories:		
- Stock of Raw Material (6,000 units × ₹ 40 × 2.25/12); (9,000 units × ₹ 40 × 2.25 /12)	45,000	67,500
- Finished Goods (Refer working note 3)	80,000	1,11,000
Receivables (Debtors) (Refer working note 4)	36,000	56,250
Minimum Cash balance	10,000	10,000
Total Current Assets/ Gross working capital (A)	1,71,000	2,44,750
(B) Current Liabilities		
Creditors for raw material (Refer working note 1)	23,750	31,875
Creditors for Expenses (Refer working note 2)	22,667	28,833
Total Current Liabilities	46,417	60,708
Net Working Capital (A – B)	1,24,583	1,84,042

Working Note:

3. Cash Cost of Production:

	Year 1 (₹)	Year 2 (₹)
Cost of Production as per projected Statement of P&L	6,00,000	7,80,000
Less: Depreciation	1,20,000	1,20,000
Cash Cost of Production	4,80,000	6,60,000
Add: Opening Stock at Average Cost:	--	80,000
Cash Cost of Goods Available for sale	4,80,000	7,40,000
Less : Closing Stock at Avg. Cost	(80,000)	(1,11,000)

$\left(\frac{₹ 4,80,000 \times 1,000}{6,000} \right); \left(\frac{₹ 7,40,000 \times 1,500}{10,000} \right)$		
Cash Cost of Goods Sold	4,00,000	6,29,000

4. Receivables (Debtors)

	Year 1 (₹)	Year 2 (₹)
Cash Cost of Goods Sold	4,00,000	6,29,000
Add : Variable Expenses @ ₹ 4	20,000	34,000
Add : Total Fixed Selling expenses (12,000 units × ₹1)	12,000	12,000
Cash Cost of Debtors	4,32,000	6,75,000
Average Debtors	36,000	56,250

6. Calculation of Net Working Capital requirement:

	(₹)	(₹)
A. Current Assets:		
Inventories:		
- Raw material stock (Refer to Working note 3)	6,64,615	
- Work in progress stock (Refer to Working note 2)	5,00,000	
- Finished goods stock (Refer to Working note 4)	13,60,000	
Receivables (Debtors) (Refer to Working note 5)	25,10,769	
Cash and Bank balance	25,000	
Gross Working Capital	50,60,384	50,60,384
B. Current Liabilities:		
Creditors for raw materials	7,15,740	

(Refer to Working note 6)		
Creditors for wages (Refer to Working note 7)	91,731	
	8,07,471	8,07,471
Net Working Capital (A - B)		42,52,913

Working Notes:**1. Annual cost of production**

	(₹)
Raw material requirements {(1,04,000 units × ₹ 80) + ₹3,20,000}	86,40,000
Direct wages {(1,04,000 units × ₹ 30) + ₹60,000}	31,80,000
Overheads (exclusive of depreciation) {(1,04,000 × ₹ 60) + ₹1,20,000}	63,60,000
Gross Factory Cost	1,81,80,000
Less: Closing W.I.P	(5,00,000)
Cost of Goods Produced	1,76,80,000
Less: Closing Stock of Finished Goods (₹1,76,80,000 × 8,000/1,04,000)	(13,60,000)
Total Cash Cost of Sales	1,63,20,000

2. Work in progress stock

	(₹)
Raw material requirements (4,000 units × ₹ 80)	3,20,000
Direct wages (50% × 4,000 units × ₹ 30)	60,000
Overheads (50% × 4,000 units × ₹ 60)	1,20,000
	5,00,000

3. **Raw material stock**

It is given that raw material in stock is average 4 weeks consumption. Since, the company is newly formed, the raw material requirement for production and work in progress will be issued and consumed during the year.

Hence, the raw material consumption for the year (52 weeks) is as follows:

	(₹)
For Finished goods (1,04,000 × ₹ 80)	83,20,000
For Work in progress (4,000 × ₹ 80)	3,20,000
	86,40,000

$$\text{Raw material stock} = \frac{\text{₹ } 86,40,000}{52 \text{ weeks}} \times 4 \text{ weeks} \quad \text{i.e. ₹ } 6,64,615$$

4. **Finished goods stock:** 8,000 units @ ₹ 170 per unit = ₹ 13,60,000

5. **Debtors for sale:** $1,63,20,000 \times \frac{8}{52} = ₹ 25,10,769$

6. **Creditors for raw material:**

Material Consumed (₹ 83,20,000 + ₹ 3,20,000)	₹ 86,40,000
Add: Closing stock of raw material	<u>₹ 6,64,615</u>
Purchases of Raw Material	<u>₹ 93,04,615</u>

$$\text{Credit allowed by suppliers} = \frac{\text{₹ } 93,04,615}{52 \text{ weeks}} \times 4 \text{ weeks} = ₹ 7,15,740$$

7. **Creditors for wages**

$$\text{Outstanding wage payment} = \frac{\text{₹ } 31,80,000}{52 \text{ weeks}} \times 1.5 \text{ weeks} = ₹ 91,731$$

7. Preparation of Statement of Working Capital Requirement for Trux Company Ltd.

	(₹)	(₹)
A. Current Assets		
(i) Inventories:		
Material (1 month) $\left(\frac{₹ 6,75,000}{12 \text{ months}} \times 1 \text{ month} \right)$	56,250	
Finished goods (1 month) $\left(\frac{₹ 21,60,000}{12 \text{ months}} \times 1 \text{ month} \right)$	1,80,000	2,36,250
(ii) Receivables (Debtors)		
For Domestic Sales $\left(\frac{₹ 15,17,586}{12 \text{ months}} \times 1 \text{ month} \right)$	1,26,466	
For Export Sales $\left(\frac{₹ 7,54,914}{12 \text{ months}} \times 3 \text{ months} \right)$	1,88,729	3,15,195
(iii) Prepayment of Selling expenses $\left(\frac{₹ 1,12,500}{12 \text{ months}} \times 3 \text{ months} \right)$		28,125
(iii) Cash in hand & at bank (net of overdraft)		1,75,000
Total Current Assets		7,54,570
B. Current Liabilities:		
(i) Payables (Creditors) for materials (2 months) $\left(\frac{₹ 6,75,000}{12 \text{ months}} \times 2 \text{ month} \right)$		1,12,500

(ii) Outstanding wages (0.5 months)		
$\left(\frac{₹5,40,000}{12\text{months}} \times 0.5\text{month} \right)$		22,500
(iii) Outstanding manufacturing expenses		
$\left(\frac{₹7,65,000}{12\text{months}} \times 1\text{month} \right)$		63,750
(iv) Outstanding administrative expenses		
$\left(\frac{₹1,80,000}{12\text{months}} \times 1\text{month} \right)$		15,000
(v) Income tax payable		42,000
Total Current Liabilities		2,55,750
Net Working Capital (A – B)		4,98,820
Add: 10% contingency margin		49,882
Total Working Capital required		5,48,702

Working Notes:**1. Calculation of Cost of Goods Sold and Cost of Sales**

	Domestic (₹)	Export (₹)	Total (₹)
Domestic Sales	18,00,000	8,10,000	26,10,000
Less: Gross profit @ 20% on domestic sales and 11.11% on export sales (Working note-2)	3,60,000	90,000	4,50,000
Cost of Goods Sold	14,40,000	7,20,000	21,60,000
Add: Selling expenses (Working note-3)	77,586	34,914	1,12,500
Cash Cost of Sales	15,17,586	7,54,914	22,72,500

2. Calculation of gross profit on Export Sales

Let domestic selling price is ₹ 100. Gross profit is ₹ 20, and then cost per unit is ₹ 80

Export price is 10% less than the domestic price i.e. ₹ 100 – (1 – 0.1) = ₹ 90

Now, gross profit will be = ₹ 90 – ₹ 80 = ₹ 10

So, Gross profit ratio at export price will be = $\frac{₹ 10}{₹ 90} \times 100 = 11.11\%$

3. Apportionment of Selling expenses between Domestic and Exports sales:

Apportionment on the basis of sales value:

$$\text{Domestic Sales} = \frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 18,00,000 = ₹ 77,586$$

$$\text{Exports Sales} = \frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 8,10,000 = ₹ 34,914$$

4. Assumptions

- (i) It is assumed that administrative expenses is related to production activities.
- (ii) Value of opening and closing stocks are equal.

8. Workings:**1. Sale receipts**

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Forecast sales (S)	1,000	1,000	1,000	1,250	1,500	2,000	1,900	2,200
	₹	₹	₹	₹	₹	₹	₹	₹
S × 15	15,000	15,000	15,000	18,750	22,500	30,000	28,500	33,000
Debtors pay:								
1 month 40%		6,000	6,000	6,000	7,500	9,000	12,000	11,400
2 month 60%		-	9,000	9,000	9,000	11,250	13,500	18,000
	-	-	15,000	15,000	16,500	20,250	25,500	29,400

2. Payment for materials – books produced two months before sale

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹	₹
Materials (Q×5)	5,000	6,250	7,500	10,000	9,500	11,000	11,000	11,500
Paid (2 months after)	-	-	5,000	6,250	7,500	10,000	9,500	11,000

3. Variable overheads

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹	₹
Var. overhead (Q×2)	2,000	2,500	3,000	4,000	3,800			
Var. overhead (Q×2.50)						5,500	5,500	5,750
Paid one month later		2,000	2,500	3,000	4,000	3,800	5,500	5,500

4. Wages payments

Month	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹
Wages (Q × 4)	5,000	6,000	8,000				
Wages (Q × 4.50)				8,550	9,900	9,900	10,350
75% this month	3,750	4,500	6,000	6,412	7,425	7,425	7,762
25% this month		1,250	1,500	2,000	2,138	2,475	2,475
		5,750	7,500	8,412	9,563	9,900	10,237

Cash budget – six months ended June

	Jan	Feb	Mar	Apr	May	Jun
	₹	₹	₹	₹	₹	₹
Receipts:						
Sales receipts	15,000	15,000	16,500	20,250	25,500	29,400
Freehold property	-	-	-	-	25,000	-
	15,000	15,000	16,500	20,250	50,500	29,400
Payments:						
Materials	5,000	6,250	7,500	10,000	9,500	11,000
Var. overheads	2,500	3,000	4,000	3,800	5,500	5,500
Wages	5,750	7,500	8,412	9,563	9,900	10,237
Printing press	-	-	-	-	10,000	-
Corporation tax	-	-	10,000	-	-	-
	13,250	16,750	29,912	23,363	34,900	26,737
Net cash flow	1,750	(1,750)	(13,412)	(3,113)	15,600	2,663
Balance b/f	1,500	3,250	1,500	(11,912)	(15,025)	575
Cumulative cash flow	3,250	1,500	(11,912)	(15,025)	575	3,238

9. Cash Budget

	Jan ₹	Feb ₹	Mar ₹	Apr ₹	May ₹	June ₹	Total ₹
Receipts							
Cash sales	36,000	48,500	43,000	44,300	51,250	54,350	2,77,400
Collections from debtors	-	36,000	48,500	43,000	44,300	51,250	2,23,050
Bank loan	-	-	-	-	30,000	-	30,000
Total	36,000	84,500	91,500	87,300	1,25,550	1,05,600	5,30,450

Payments							
Materials	-	25,000	31,000	25,500	30,600	37,000	1,49,100
Salaries and wages	10,000	12,100	10,600	25,000	22,000	23,000	1,02,700
Production overheads	-	6,000	6,300	6,000	6,500	8,000	32,800
Office & selling overheads	-	5,500	6,700	7,500	8,900	11,000	39,600
Sales commission	2,160	2,910	2,580	2,658	3,075	3,261	16,644
Capital expenditure	-	8,000	-	25,000	-	-	33,000
Dividend	-	-	-	-	-	35,000	35,000
Total	12,160	59,510	57,180	91,658	71,075	1,17,261	4,08,844
Net cash flow	23,840	24,990	34,320	(4,358)	54,475	(11,661)	1,21,606
Balance, beginning of month	72,500	96,340	1,21,330	1,55,650	1,51,292	2,05,767	72,500
Balance, end of month	96,340	1,21,330	1,55,650	1,51,292	2,05,767	1,94,106	1,94,196

10. (a)**Cash Budget***(in thousands)*

	Nov.	Dec.	Jan.	Feb.	Mar.
	₹	₹	₹	₹	₹
Opening Balance (A)			50	50	50
Sales	500	600	600	1,000	650
Receipts:					
Collections, current month's sales			120	200	130
Collections, previous month's sales			420	420	700
Collections, previous 2 month's sales			50	60	60
Total (B)			590	680	890
Purchases		360	600	390	450
Payments:					
Payment for purchases			360	600	390

Labour costs			150	200	160
Other expenses			100	100	100
Total (C)			610	900	650
Surplus/Deficit (D) = (A + B – C)			30	(170)	290
Minimum cash balance (E)			50	50	50
Additional borrowings (F) = (E - D)			20	220	(240)

	Jan.	Feb.	Mar.
	₹	₹	₹
Additional borrowings	20	220	(240)
Cumulative borrowings (Opening balance of 400)	420	640	400

The amount of financing peaks in February owing to the need to pay for purchases made the previous month and higher labour costs. In March, substantial collections are made on the prior month's billings, causing large net cash inflow sufficient to pay off the additional borrowings.

(b) Pro forma Balance Sheet, 31st March, 2023

Equity & liabilities	Amount (₹ in '000)	Assets	Amount (₹ in '000)
Equity shares capital	100	Net fixed assets	1,836
Retained earnings	1,529	Inventories	635
Long-term borrowings	450	Accounts receivables	620
Accounts payables	450	Cash and bank	50
Loan from banks	400		
Other liabilities	212		
	3,141		3,141

Accounts receivable = Sales in March × 0.8 + Sales in February × 0.1

$$= ₹ 650 \times 0.8 + ₹ 1,000 \times 0.1 = ₹ 620$$

$$\begin{aligned} \text{Inventories} &= ₹ 545 + \text{Total purchases from January to March} - \text{Total sales from January to March} \times 0.6 \\ &= ₹ 545 + (₹ 600 + ₹ 390 + ₹ 450) - (₹ 600 + ₹ 1000 + ₹ 650) \times 0.6 = ₹ 635 \end{aligned}$$

$$\text{Accounts payable} = \text{Purchases in March} = ₹ 450$$

$$\begin{aligned} \text{Retained earnings} &= ₹ 1,439 + \text{Sales} - \text{Payment for purchases} - \text{Labour costs} - \text{Other expenses, all for January to March} \\ &= ₹ 1,439 + (₹ 600 + ₹ 1000 + ₹ 650) - (₹ 360 + ₹ 600 + ₹ 390) - (₹ 150 + ₹ 200 + ₹ 160) - (₹ 100 + ₹ 100 + ₹ 100) = ₹ 1,529 \end{aligned}$$

11. Evaluation of Alternative Collection Programmes

	Present Policy	Alternative I	Alternative II
	₹	₹	₹
Sales Revenues	30,00,000	30,00,000	30,00,000
Average Collection Period (ACP) (days)	50	40	30
Receivables (₹) $\left(\text{Sales} \times \frac{\text{ACP}}{360} \right)$	4,16,667	3,33,333	2,50,000
Reduction in Receivables from Present Level (₹)	–	83,334	1,66,667
Savings in Interest @ 10% p.a. (A)	–	₹ 8,333	₹ 16,667
% of Bad Debt Loss	5%	4%	3%
Amount (₹)	1,50,000	1,20,000	90,000
Reduction in Bad Debts from Present Level (B)	–	30,000	60,000

Incremental Benefits from Present Level (C) = (A) + (B)	–	38,333	76,667
Collection Expenses (₹)	30,000	60,000	95,000
Incremental Collection Expenses from Present Level (D)	–	<u>30,000</u>	<u>65,000</u>
Incremental Net Benefit (C – D)	–	<u>₹ 8,333</u>	<u>₹ 11,667</u>

Conclusion: From the analysis it is apparent that Alternative I has a benefit of ₹ 8,333 and Alternative II has a benefit of ₹ 11,667 over present level. Alternative II has a benefit of ₹ 3,334 more than Alternative I. Hence Alternative II is more viable.

(Note: In absence of Cost of Sales, sales has been taken for purpose of calculating investment in receivables. 1 year = 360 days.)

12. Statement showing the Evaluation of Proposal

Particulars	₹
A. Expected Profit:	
Net Sales	1,00,000
Less: Production and Selling Expenses @ 80%	(80,000)
Profit before providing for Bad Debts	20,000
Less: Bad Debts @10%	(10,000)
Profit before Tax	10,000
Less: Tax @ 50%	(5,000)
Profit after Tax	5,000
B. Opportunity Cost of Investment in Receivables	(2,500)
C. Net Benefits (A – B)	2,500

Advise: The sales manager's proposal should be accepted.

Working Note: Calculation of Opportunity Cost of Funds

$$\frac{\text{Opportunity Cost}}{\text{Collection period}} = \frac{\text{Total Cost of Credit Sales} \times \text{Required Rate of Return}}{12} = \frac{₹ 80,000 \times \frac{1.5}{12} \times \frac{25}{100}}{100} = ₹ 2,500$$

Statement showing the Acceptable Degree of Risk of Non-payment

Particulars	Required Rate of Return		
	30%	40%	60%
Sales	1,00,000	1,00,000	1,00,000
Less: Production and Sales Expenses	80,000	80,000	80,000
Profit before providing for Bad Debts	20,000	20,000	20,000
Less: Bad Debts (assume X)	X	X	X
Profit before tax	20,000 – X	20,000 – X	20,000 – X
Less: Tax @ 50%	(20,000 – X) 0.5	(20,000 – X) 0.5	(20,000 – X) 0.5
Profit after Tax	10,000 – 0.5X	10,000 – 0.5X	10,000 – 0.5X
Required Return (given)	30% of 10,000*	40% of 10,000*	60% of 10,000*
	= ₹ 3,000	= ₹ 4,000	= ₹ 6,000

$$\begin{aligned}
 \text{*Average Debtors} &= \text{Total Cost of Credit Sales} \times \frac{\text{Collection period}}{12} \\
 &= ₹ 80,000 \times \frac{1.5}{12} = ₹ 10,000
 \end{aligned}$$

Computation of the value and percentage of X in each case is as follows:

$$\begin{aligned}
 \text{Case I} \quad 10,000 - 0.5x &= 3,000 \\
 0.5x &= 7,000 \\
 X &= 7,000/0.5 = ₹ 14,000 \\
 \text{Bad Debts as \% of sales} &= ₹ 14,000/₹1,00,000 \times 100 = 14\% \\
 \text{Case II} \quad 10,000 - 0.5x &= 4,000 \\
 0.5x &= 6,000 \\
 X &= 6,000/0.5 = ₹ 12,000 \\
 \text{Bad Debts as \% of sales} &= ₹ 12,000/₹1,00,000 \times 100 = 12\% \\
 \text{Case III} \quad 10,000 - 0.5x &= 6,000 \\
 0.5x &= 4,000
 \end{aligned}$$

$$X = 4,000/0.5 = ₹ 8,000$$

$$\text{Bad Debts as \% of sales} = ₹ 8,000/₹1,00,000 \times 100 = 8\%$$

Thus, it is found that the Acceptable Degree of risk of non-payment is 14%, 12% and 8% if required rate of return (after tax) is 30%, 40% and 60% respectively.

13. Statement showing the Evaluation of Debtors Policies

Particulars	Proposed Policy ₹
A. Expected Profit:	
(a) Credit Sales	15,00,000
(b) Total Cost	
(i) Variable Costs	14,50,000
(ii) Recurring Costs	5,000
	14,55,000
(c) Bad Debts	15,000
(d) Expected Profit [(a) – (b) – (c)]	30,000
B. Opportunity Cost of Investments in Receivables	68,787
C. Net Benefits (A – B)	(38,787)

Recommendation: The Proposed Policy should not be adopted since the net benefits under this policy are negative

Working Note: Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{365} \times \frac{\text{Rate of Return}}{100}$$

Particulars	15%	34%	30%	20%	Total
A. Total Cost	2,18,250	4,94,700	4,36,500	2,91,000	14,40,450
B. Collection period	30/365	60/365	90/365	100/365	
C. Required Rate of Return	24%	24%	24%	24%	
D. Opportunity Cost (A × B × C)	4,305	19,517	25,831	19,134	68,787

14.

Cost Structure for 52,000 units	
Particulars	Amount (₹)
Raw Material @ ₹ 400P	2,08,00,000
Direct Wages @ ₹ 150	78,00,000
Manufacturing Overheads @ ₹ 200	1,04,00,000
Selling and Distribution OH @ ₹ 100	52,00,000
Total Cost	4,42,00,000
Sales @ ₹ 1,000	5,20,00,000

Particulars	Calculation	Amount (₹)
A. Current Assets:		
Raw Material Stock	$2,08,00,000 \times \frac{4}{52}$	16,00,000
Work in Progress (WIP) Stock**	$2,08,00,000 + \frac{(78,00,000 + 1,04,00,000)}{2} \times \frac{4}{52}$	23,00,000
Finished Goods Stock	$4,42,00,000 \times \frac{4}{52}$	34,00,000
Receivables	$5,20,00,000 \times \frac{8}{52}$	80,00,000
Cash		<u>50,000</u>
	Total Current Assets	1,53,50,000
B. Current Liabilities:		
Creditors	$2,08,00,000 \times \frac{4}{52}$	<u>16,00,000</u>
C. Working Capital Estimates(A-B)		1,37,50,000

** Assuming that labour and overhead are incurred evenly throughout the year.

Answers to the Case Scenarios

i.	(a)	ii.	(a)	iii.	(c)	iv.	(a)	v.	(b)
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1. (i)

	Units	Per unit (₹)	Amount (₹)
Raw Material consumption	3,50,000	200	7,00,00,000
labour cost	3,50,000	150	5,25,00,000
Production Overheads	3,50,000	150	5,25,00,000
Cost of Production	3,50,000	500	17,50,00,000
Less: Stock of FG	50,000	500	2,50,00,000
COGS	3,00,000	500	15,00,00,000
Selling and admin exp	3,00,000	250	7,50,00,000
Cost of Sales	3,00,000	750	22,50,00,000
Sales	3,00,000	1000	30,00,00,000
Profit	3,00,000	250	7,50,00,000

Stock of FG (sq. mtr.) = $30,00,000 \times 2/12 = 50,000$

Units sold = 3,00,000

Raw material consumed (sq. mtr.) = 3,50,000

Raw Material Purchases = Consumption + RM stock (15%)
 = 7,00,00,000 + 1,05,00,000
 = ₹ 8,05,00,000

(ii) Stock of Raw Material (15% of 7,00,00,000) = 1,05,00,000

Stock of finished goods = 2,50,00,000

Debtors ($22,50,00,000 \times 3/12$) = 5,62,50,000

Cash = 25,00,000

Total Current Assets = 9,42,50,000

(iii) Working Capital Statement

	Amount (₹)
Stock of Raw Material (15% of 7,00,00,000)	1,05,00,000
Stock of finished goods	2,50,00,000

Debtors ($22,50,00,000 \times 3/12$)	5,62,50,000
Cash	25,00,000
Total Current Assets	9,42,50,000
Creditors ($8,05,00,000 \times 1/12$)	67,08,333
O/s Exp ($18,00,00,000 \times 1/12$)	1,50,00,000
Total Current Liabilities	2,17,08,333
Net Working Capital	7,25,41,667

(iv) Cost reducing debtors credit period

Debtors credit period	= 2 months
Debtors balance	= 21,37,50,000 (2,85,000 units) x 2/12 = ₹3,56,25,000
Debtors credit period	= 3 months
Debtors balance	= 22,50,00,000 x 3/12 = ₹ 5,62,50,000
Amount released from debtors	= ₹ 2,06,25,000
reduction in profit (15,000 units x ₹ 250)	= ₹ 37,50,000
% p.a. cost ($37,50,000/2,06,25,000$)	= 18.18%

Costs of factoring

Commission (2% of 30 crores)	= 60,00,000
Interest	= ₹ 58,50,000
(30cr x 65% x 12% x 3/12)	
savings	= ₹ 36,00,000
Net cost of factoring	$\frac{82,50,000}{65\% \text{ of } 30\text{cr. i.e. } 19,50,00,000} \times \frac{12}{3} = ₹ 82,50,000$
% p.a. cost	= 16.92%

(v) 5,44,06,250 and 18.33%

Maximum Permissible Bank Finance	= 75% of 7,25,41,667 = ₹ 5,44,06,250
Annualised cost of bank loan	= 16.5/90% = 18.33%

UNIT - V

MANAGEMENT OF PAYABLES (CREDITORS)

23. INTRODUCTION

There is an old age saying in business that if you can buy well then you can sell well. Management of your creditors and suppliers is just as important as the management of your debtors.

Trade creditor is a spontaneous / short term source of finance in the sense that it arises from ordinary business transaction. But it is also important to look after your creditors - slow payment by you may create ill-feeling and your supplies could be disrupted and also create a bad image for your company.

Creditors are a vital part of effective cash management and should be managed carefully to enhance the cash position.

24. COST AND BENEFITS OF TRADE CREDIT

(a) Cost of Availing Trade Credit

Normally it is considered that the trade credit does not carry any cost. However, it carries the following costs:

- (i) **Price:** There is often a discount on the price that the firm undergoes when it uses trade credit, since it can take advantage of the discount only if it pays immediately. This discount can translate into a high implicit cost.
- (ii) **Loss of goodwill:** If the credit is overstepped, suppliers may discriminate against delinquent customers if supplies become short. As with the effect of any loss of goodwill, it depends very much on the relative market strengths of the parties involved.
- (iii) **Cost of managing:** Management of creditors involves administrative and accounting costs that would otherwise be incurred.
- (iv) **Conditions:** Sometimes most of the suppliers insist that for availing the credit facility the order should be of some minimum size or even on regular basis.

(b) Cost of Not Taking Trade Credit

On the other hand, the costs of not availing credit facilities are as under:

- (i) **Impact of Inflation:** If inflation persists then the borrowers are favored over the lenders as they were better off to pay the fixed outstanding amount later than sooner. Also, the subsequent transactions shall be at higher prices.
- (ii) **Interest:** Trade credit is a type of interest free loan, therefore failure to avail this facility has an interest cost. This cost is further increased if interest rates are higher.
- (iii) **Inconvenience:** Sometimes it may also cause inconvenience to the supplier if the supplier is geared to the deferred payment.

**25. COMPUTATION OF COST OF PAYABLES**

By using the trade credit judiciously, a firm can reduce the effect of growth or burden on investments in Working Capital.

Now question arises how to calculate the cost of not taking the discount.

The following equation can be used to calculate nominal cost, on an annual basis of not taking the discount:

$$\frac{d}{100-d} \times \frac{365 \text{ days}}{t}$$

However, the above formula does not take into account the compounding effect and therefore, the cost of credit shall be even higher. The cost of lost cash discount can be estimated by the formula:

$$\left(\frac{100}{100-d} \right)^{\frac{365}{t}} - 1$$

Where,

d = Size of discount i.e. for 6% discount, d = 6

t = The reduction in the payment period in days, necessary to obtain the early discount or Days Credit Outstanding – Discount Period.

ILLUSTRATION 17

Suppose ABC Ltd. has been offered credit terms from its major supplier of 2/10, net 45. Hence the company has the choice of paying ₹ 10 per ₹ 100 or to invest ₹ 98 for an additional 35 days and eventually pay the supplier ₹ 100 per ₹ 100. The decision as to whether the discount should be accepted depends on the opportunity cost of investing ₹ 98 for 35 days. ANALYSE what should the company do?

SOLUTION

If the company does not avail the cash discount and pays the amount after 45 days, the implied cost of interest per annum would be approximately:

$$\left(\frac{100}{100-2} \right)^{\frac{365}{35}} - 1 = 23.5\%$$

Now let us assume that ABC Ltd. can invest the additional cash and can obtain an annual return of 25% and if the amount of invoice is ₹ 10,000. The alternatives are as follows:

	Refuse discount	Accept discount
	₹	₹
Payment to supplier	10,000	9,800
Return from investing ₹ 9,800 between day 10 and day 45: $\frac{35}{365} \times ₹ 9,800 \times 25\%$	(235)	
Net Cost	9,765	9,800

Advise: Thus, it is better for the company to refuse the discount, as return on cash retained is more than the saving on account of discount.

ILLUSTRATION 18

The Dolce Company purchases raw materials on terms of 2/10, net 30. A review of the company's records by the owner, Mr. Gautam, revealed that payments are usually made 15 days after purchases are made. When asked why the firm did not take advantage of its discounts, the accountant, Mr. Rohit, replied that it cost only 2 per cent for these funds, whereas a bank loan would cost the company 12 per cent.

- (a) *ANALYSE what mistake is Rohit making?*
- (b) *If the firm could not borrow from the bank and was forced to resort to the use of trade credit funds, what suggestion might be made to Rohit that would reduce the annual interest cost? IDENTIFY.*

SOLUTION

- (a) Rohit's argument of comparing 2% discount with 12% bank loan rate is not rational as 2% discount can be earned by making payment 5 days in advance i.e. within 10 days rather 15 days as payments are made presently. Whereas 12% bank loan rate is for a year.

Assume that the purchase value is ₹100, the discount can be earned by making payment within 10 days is ₹2, therefore, net payment would be ₹98 only. Annualized benefit

$$= \frac{₹2}{₹98} \times \frac{365 \text{ days}}{5 \text{ days}} \times 100 = 149\%$$

This means cost of not taking cash discount is 149%.

- (b) If the bank loan facility could not be available, then in this case the company should resort to utilise maximum credit period as possible.

Therefore, payment should be made in 30 days to reduce the interest cost.

UNIT - VI

FINANCING OF WORKING CAPITAL



26. INTRODUCTION

After determining the amount of working capital required, the next step to be taken by the finance manager is to arrange the funds.

As discussed earlier, it is advisable that the finance manager bifurcate the working capital requirements between the permanent working capital and temporary working capital.

The permanent working capital is always needed irrespective of sales fluctuation; hence it should be financed by the long-term sources such as debt and equity. On the contrary the temporary working capital may be financed by the short-term sources of finance.

Broadly speaking, the working capital finance may be classified between the two categories:

- (i) Spontaneous sources; and
- (ii) Negotiable sources.

Spontaneous Sources: Spontaneous sources of finance are those which naturally arise in the course of business operations. Trade credit, credit from employees, credit from suppliers of services, etc. are some of the examples which may be quoted in this respect.

Negotiated Sources: On the other hand, the negotiated sources, as the name implies, are those which have to be specifically negotiated with lenders say, commercial banks, financial institutions, general public etc.

The finance manager has to be very careful while selecting a particular source, or a combination thereof for financing of working capital. Generally, the following parameters will guide his decisions in this respect:

- (i) Cost factor
- (ii) Impact on credit rating

- (iii) Feasibility
- (iv) Reliability
- (v) Restrictions
- (vi) Hedging approach or matching approach i.e., Financing of assets with the same maturity as of assets.

27. SOURCES OF FINANCE

27.1 Spontaneous Sources of Finance

(a) Trade Credit: As outlined above trade credit is a spontaneous source of finance which is normally extended to the purchaser organization by the sellers or services providers. This source of financing working capital is more important since it contributes to about one-third of the total short-term requirements. The dependence on this source is higher due to lesser cost of finance as compared with other sources. Trade credit is guaranteed when a company acquires supplies, merchandise or materials and does not pay immediately. If a buyer is able to get the credit without completing much formality, it is termed as 'open account trade credit.'

(b) Bills Payable: On the other hand, in the case of "Bills Payable" the purchaser will have to give a written promise to pay the amount of the bill/invoice either on demand or at a fixed future date to the seller or the bearer of the note.

Due to its simplicity, easy availability and lesser explicit cost, the dependence on this source is much more in all small or big organizations. Especially, for small enterprises this form of credit is more helpful to small and medium enterprises. The amount of such financing depends on the volume of purchases and the payment timing.

(c) Accrued Expenses: Another spontaneous source of short-term financing is the accrued expenses or the outstanding expenses liabilities. The accrued expenses refer to the services availed by the firm, but the payment for which has yet to be made. It is a built in and an automatic source of finance as most of the services like wages, salaries, taxes, duties etc., are paid at the end of the period. The accrued

expenses represent an interest free source of finance. There is no explicit or implicit cost associated with the accrued expenses and the firm can ensure liquidity by accruing these expenses.

27.2 Inter-corporate Loans and Deposits

Sometimes, organizations having surplus funds invest for short-term period with other organizations. The rate of interest will be higher than the bank rate of interest and depends on the financial soundness of the borrower company. This source of finance reduces dependence on bank financing.

27.3 Commercial Papers

Commercial Paper (CP) is an unsecured promissory note issued by a firm to raise funds for a short period. This is an instrument that enables highly rated corporate borrowers for short-term borrowings and provides an additional financial instrument to investors with a freely negotiable interest rate. The maturity period ranges from minimum 7 days to less than 1 year from the date of issue. CP can be issued in denomination of ₹ 5 lakhs or multiples thereof.

Advantages of CP: From the point of the issuing company, CP provides the following benefits:

- (a) CP is sold on an unsecured basis and does not contain any restrictive conditions.
- (b) Maturing CP can be repaid by selling new CP and thus can provide a continuous source of funds.
- (c) Maturity of CP can be tailored to suit the requirement of the issuing firm.
- (d) CP can be issued as a source of fund even when money market is tight.
- (e) Generally, the cost of CP to the issuing firm is lower than the cost of commercial bank loans.

However, CP as a source of financing has its own limitations:

- (i) Only highly credit rating firms can use it. New and moderately rated firm generally are not in a position to issue CP.

- (ii) CP can neither be redeemed before maturity nor can be extended beyond maturity.

27.4 Funds Generated from Operations

Funds generated from operations, during an accounting period, increase working capital by an equivalent amount. The two main components of funds generated from operations are profit and depreciation. Working capital will increase by the extent of funds generated from operations. Students may refer to funds flow statement given earlier in this chapter.

27.5 Public Deposits

Deposits from the public are one of the important sources of finance particularly for well-established big companies with huge capital base for short and medium-term.

27.6 Bills Discounting

Bill discounting is recognized as an important short-term Financial Instrument and it is widely used method of short-term financing. In a process of bill discounting, the supplier of goods draws a bill of exchange with direction to the buyer to pay a certain amount of money after a certain period, and gets its acceptance from the buyer or drawee of the bill.

27.7 Bill Rediscounting Scheme

The Bill rediscounting Scheme was introduced by Reserve Bank of India with effect from 1st November, 1970 in order to extend the use of the bill of exchange as an instrument for providing credit and the creation of a bill market in India with a facility for the rediscounting of eligible bills by banks. Under the bills rediscounting scheme, all licensed scheduled banks are eligible to offer bills of exchange to the Reserve Bank for rediscount.

27.8 Factoring

Students may refer to the unit on Receivable Management wherein the concept of factoring has been discussed. Factoring is a method of financing whereby a firm

sells its trade debts at a discount to a financial institution. In other words, factoring is a continuous arrangement between a financial institution, (namely the factor) and a firm (namely the client) which sells goods and services to trade customers on credit. As per this arrangement, the factor purchases the client's trade debts including accounts receivables either with or without recourse to the client, and thus, exercises control over the credit extended to the customers and administers the sales ledger of his client. To put it in a layman's language, a factor is an agent who collects the dues of his client for a certain fee.

The differences between Factoring and Bills discounting are as follows:

- (i) Factoring is called as 'Invoice factoring' whereas bills discounting is known as "Invoice discounting".
- (ii) In factoring the parties are known as client, factor and debtor whereas in bills discounting they are known as Drawer, Drawee and Payee.
- (iii) Factoring is a sort of management of book debts whereas bills discounting is a sort of borrowing from commercial banks.
- (iv) For factoring there is no specific Act; whereas in the case of bills discounting, the Negotiable Instrument Act is applicable.

28. WORKING CAPITAL FINANCE FROM BANKS

Banks in India today constitute the major suppliers of working capital credit to any business activity. Recently, some term lending financial institutions have also announced schemes for working capital financing. The two committees viz., Tandon Committee and Chore Committee have evolved definite guidelines and parameters in working capital financing, which have laid the foundations for development and innovation in the area.

28.1 Instructions on Working Capital Finance by Banks

Assessment of Working Capital

- Reserve Bank of India has withdrawn the prescription, in regard to assessment of working capital needs, based on the concept of Maximum Permissible Bank Finance (MPBF), in April 1997. Banks are now free to evolve, with the approval

of their Boards, methods for assessing the working capital requirements of borrowers, within the prudential guidelines and exposure norms prescribed. Banks, however, have to take into account Reserve Bank's instructions relating to directed credit (such as priority sector, export, etc.), and prohibition of credit (such as bridge finance, rediscounting of bills earlier discounted by NBFCs) while formulating their lending policies.

- With the above liberalizations, all the instructions relating to MPBF issued by RBI from time to time stand withdrawn. Further, various instructions/guidelines issued to banks with objective of ensuring lending discipline in appraisal, sanction, monitoring and utilization of bank finance cease to be mandatory. However, banks have the option of incorporating such of the instructions/guidelines as are considered necessary in their lending policies/procedures.

29. FORMS OF BANK CREDIT

The bank credit will generally be in the following forms:

- **Cash Credit:** This facility will be given by the banker to the customers by giving certain amount of credit facility on continuous basis. The borrower will not be allowed to exceed the limits sanctioned by the bank.
- **Bank Overdraft:** It is a short-term borrowing facility made available to the companies in case of urgent need of funds. The banks will impose limits on the amount they can lend. When the borrowed funds are no longer required they can quickly and easily be repaid. The banks issue overdrafts with a right to call them in at short notice.
- **Bills Discounting:** The Company which sells goods on credit will normally draw a bill on the buyer who will accept it and sends it to the seller of goods. The seller, in turn discounts the bill with his banker. The banker will generally earmark the discounting bill limit.
- **Bills Acceptance:** To obtain finance under this type of arrangement a company draws a bill of exchange on bank. The bank accepts the bill thereby promising to pay out the amount of the bill at some specified future date.

- **Line of Credit:** Line of Credit is a commitment by a bank to lend a certain amount of funds on demand specifying the maximum amount.
- **Letter of Credit:** It is an arrangement by which the issuing bank on the instructions of a customer or on its own behalf undertakes to pay or accept or negotiate or authorizes another bank to do so against stipulated documents subject to compliance with specified terms and conditions.
- **Bank Guarantees:** Bank guarantee is one of the facilities that the commercial banks extend on behalf of their clients in favour of third parties who will be the beneficiaries of the guarantees.

SUMMARY

- ◆ Working Capital Management involves managing the balance between firm's short-term assets and its short-term liabilities.
- ◆ From the value point of view, Working Capital can be defined as Gross Working Capital or Net Working Capital.
- ◆ From the point of view of time, the term working capital can be divided into two categories viz., Permanent and temporary.
- ◆ A large amount of working capital would mean that the company has idle funds. Since funds have a cost, the company has to pay huge amount as interest on such funds. If the firm has inadequate working capital, such firm runs the risk of insolvency.
- ◆ Some of the items/factors which need to be considered while planning for working capital requirement are nature of business, market and demand conditions, operating efficiency, credit policy etc.
- ◆ Finance manager has to pay particular attention to the levels of current assets and their financing. To decide the levels and financing of current assets, the risk return trade off must be taken into account.
- ◆ In determining the optimum level of current assets, the firm should balance the profitability – Solvency tangle by minimizing total costs.

- ◆ Working Capital cycle indicates the length of time between a company's paying for materials, entering into stock and receiving the cash from sales of finished goods. It can be determined by adding the number of days required for each stage in the cycle.
- ◆ Treasury management is defined as 'the corporate handling of all financial matters, the generation of external and internal funds for business, the management of currencies and cash flows and the complex, strategies, policies and procedures of corporate finance.
- ◆ The main objectives of cash management for a business are:-
 - (a) Provide adequate cash to each of its units;
 - (b) No funds are blocked in idle cash; and
 - (c) The surplus cash (if any) should be invested in order to maximize returns for the business.
- ◆ Large amounts are tied up in sundry debtors, there are chances of bad debts and there will be cost of collection of debts. On the contrary, if the investment in sundry debtors is low, the sales may be restricted, since the competitors may offer more liberal terms. Therefore, management of sundry debtors is an important issue and requires proper policies and their implementation.
- ◆ There are basically three aspects of management of sundry debtors: Credit policy, Credit Analysis and Control of receivables.
- ◆ Trade creditor is a spontaneous source of finance in the sense that it arises from ordinary business transaction. But it is also important to look after your creditors - slow payment by you may create ill-feeling and your supplies could be disrupted and also create a bad image for your company.
- ◆ It is advisable that the finance manager bifurcates the working capital requirements between the permanent working capital and temporary working capital.
- ◆ The permanent working capital is always needed irrespective of sales fluctuations, hence should be financed by the long-term sources such as debt and equity. On the contrary the temporary working capital may be financed by the short-term sources of finance.

TEST YOUR KNOWLEDGE

Multiple Choice Questions (MCQs)

1. *The credit terms may be expressed as "3/15 net 60". This means that a 3% discount will be granted if the customer pays within 15 days, if he does not avail the offer, he must make payment within 60 days.*
 - (a) *I agree with the statement*
 - (b) *I do not agree with the statement*
 - (c) *I cannot say.*
2. *The term 'net 50' implies that the customer will make payment:*
 - (a) *Exactly on 50th day*
 - (b) *Before 50th day*
 - (c) *Not later than 50th day*
 - (d) *None of the above.*
3. *Trade credit is a source of :*
 - (a) *Long-term finance*
 - (b) *Medium term finance*
 - (c) *Spontaneous source of finance*
 - (d) *None of the above.*
4. *The term float is used in:*
 - (a) *Inventory Management*
 - (b) *Receivable Management*
 - (c) *Cash Management*
 - (d) *Marketable securities.*
5. *William J Baumol's model of Cash Management determines optimum cash level where the carrying cost and transaction cost are:*
 - (a) *Maximum*

- (b) *Minimum*
 - (c) *Medium*
 - (d) *None of the above.*
6. *In Miller – ORR Model of Cash Management:*
- (a) *The lower, upper limit, and return point of Cash Balances are set out*
 - (b) *Only upper limit and return point are decided*
 - (c) *Only lower limit and return point are decided*
 - (d) *None of the above are decided.*
7. *Working Capital is defined as:*
- (a) *Excess of current assets over current liabilities*
 - (b) *Excess of current liabilities over current assets*
 - (c) *Excess of Fixed Assets over long-term liabilities*
 - (d) *None of the above.*
8. *Working Capital is also known as "Circulating Capital, fluctuating Capital and revolving capital". The aforesaid statement is;*
- (a) *Correct*
 - (b) *Incorrect*
 - (c) *Cannot say.*
9. *The basic objectives of Working Capital Management are:*
- (a) *Optimum utilization of resources for profitability*
 - (b) *To meet day-to-day current obligations*
 - (c) *Ensuring marginal return on current assets is always more than cost of capital*
 - (d) *Select any one of the above statements.*
10. *The term Gross Working Capital is known as:*
- (a) *The investment in current liabilities*

- (b) *The investment in long-term liability*
 - (c) *The investment in current assets*
 - (d) *None of the above.*
11. *The term net working capital refers to the difference between the current assets minus current liabilities.*
- (a) *The statement is correct*
 - (b) *The statement is incorrect*
 - (c) *I cannot say.*
12. *The term "Core current assets" was coined by:*
- (a) *Chore Committee*
 - (b) *Tandon Committee*
 - (c) *Jilani Committee*
 - (d) *None of the above.*
13. *The concept operating cycle refers to the average time which elapses between the acquisition of raw materials and the final cash realization. This statement is:*
- (a) *Correct*
 - (b) *Incorrect*
 - (c) *Partially True*
 - (d) *I cannot say.*
14. *As a matter of self-imposed financial discipline can there be a situation of zero working capital now-a-days in some of the professionally managed organizations.*
- (a) *Yes*
 - (b) *No*
 - (c) *Impossible*
 - (d) *Cannot say.*

15. *Over trading arises when a business expands beyond the level of funds available. The statement is:*
- (a) *Incorrect*
 - (b) *Correct*
 - (c) *Partially correct*
 - (d) *I cannot say.*
16. *A Conservative Working Capital strategy calls for high levels of current assets in relation to sales.*
- (a) *I agree*
 - (b) *Do not agree*
 - (c) *I cannot say.*
17. *The term Working Capital leverage refer to the impact of level of working capital on company's profitability. This measures the responsiveness of ROCE for changes in current assets.*
- (a) *I agree*
 - (b) *Do not agree*
 - (c) *The statement is partially true.*
18. *The term spontaneous source of finance refers to the finance which naturally arise in the course of business operations. The statement is:*
- (a) *Correct*
 - (b) *Incorrect*
 - (c) *Partially Correct*
 - (d) *I cannot say.*
19. *Under hedging approach to financing of working capital requirements of a firm, each asset in the balance sheet assets side would be offset with a financing instrument of the same approximate maturity. This statement is:*
- (a) *Incorrect*

- (b) *Correct*
 - (c) *Partially correct*
 - (d) *I cannot say.*
20. *Trade credit is a:*
- (a) *Negotiated source of finance*
 - (b) *Hybrid source of finance*
 - (c) *Spontaneous source of finance*
 - (d) *None of the above.*
21. *Factoring is a method of financing whereby a firm sells its trade debts at a discount to a financial institution. The statement is:*
- (a) *Correct*
 - (b) *Incorrect*
 - (c) *Partially correct*
 - (d) *I cannot say.*
22. *A factoring arrangement can be both with recourse as well as without recourse:*
- (a) *True*
 - (b) *False*
 - (c) *Partially correct*
 - (d) *Cannot say.*
23. *The Bank financing of working capital will generally be in the following form. Cash Credit, Overdraft, bills discounting, bills acceptance, line of credit; Letter of credit and bank guarantee.*
- (a) *I agree*
 - (b) *I do not agree*
 - (c) *I cannot say.*

24. *When the items of inventory are classified according to value of usage, the technique is known as:*
- (a) *XYZ Analysis*
 - (b) *ABC Analysis*
 - (c) *DEF Analysis*
 - (d) *None of the above.*
25. *When a firm advises its customers to mail their payments to special Post Office collection centers, the system is known as.*
- (a) *Concentration banking*
 - (b) *Lock Box system*
 - (c) *Playing the float*
 - (d) *None of the above.*

Theoretical Questions

1. *DISCUSS the factors to be taken into consideration while determining the requirement of working capital.*
2. *DISCUSS the liquidity vs. profitability issue in management of working capital.*
3. *DISCUSS the estimation of working capital need based on operating cycle process.*
4. *EXPLAIN briefly the functions of Treasury Department.*
5. *EXPLAIN Baumol's Model of Cash Management.*
6. *STATE the advantage of Electronic Cash Management System.*
7. *EXPLAIN with example the formula used for determining optimum cash balance according to Baumol's cash management model.*
8. *DISCUSS Miller-Orr Cash Management model.*
9. *EXPLAIN briefly the accounts receivable systems.*
10. *DESCRIBE Factoring.*

11. DESCRIBE the various forms of bank credit in financing the working capital of a business organization.

Practical Problems

1. Following information is forecasted by R Limited for the year ending 31st March, 2022:

	Balance as at 31 st March, 2022	Balance as at 31 st March, 2021
	(₹ in lakh)	(₹ in lakh)
Raw Material	65	45
Work-in-progress	51	35
Finished goods	70	60
Receivables	135	112
Payables	71	68
Annual purchases of raw material (all credit)	400	
Annual cost of production	450	
Annual cost of goods sold	525	
Annual operating cost	325	
Annual sales (all credit)	585	

You may take one year as equal to 365 days.

You are required to CALCULATE:

- Net operating cycle period.
 - Number of operating cycles in the year.
 - Amount of working capital requirement.
2. The following data relating to an auto component manufacturing company is available for the year 2021-22:

Raw material held in storage

20 days

<i>Receivables' collection period</i>	<i>30 days</i>
<i>Conversion process period</i> <i>(raw material – 100%, other costs – 50% complete)</i>	<i>10 days</i>
<i>Finished goods storage period</i>	<i>45 days</i>
<i>Credit period from suppliers</i>	<i>60 days</i>
<i>Advance payment to suppliers</i>	<i>5 days</i>
<i>Total cash operating expenses per annum</i>	<i>₹ 800 lakhs</i>
<i>75% of the total cash operating expenses are for raw material. 360 days are assumed in a year.</i>	

You are required to CALCULATE:

- (i) Each item of current assets and current liabilities,*
- (ii) The working capital requirement, if the company wants to maintain a cash balance of ₹ 10 lakhs at all times.*

3. *The following figures and ratios are related to a company:*

<i>(i) Sales for the year (all credit)</i>	<i>₹ 90,00,000</i>
<i>(ii) Gross Profit ratio</i>	<i>35 percent</i>
<i>(iii) Fixed assets turnover (based on cost of goods sold)</i>	<i>1.5</i>
<i>(iv) Stock turnover (based on cost of goods sold)</i>	<i>6</i>
<i>(v) Liquid ratio</i>	<i>1.5:1</i>
<i>(vi) Current ratio</i>	<i>2.5:1</i>
<i>(vii) Receivables (Debtors) collection period</i>	<i>1 month</i>
<i>(viii) Reserves and surplus to Share capital</i>	<i>1:1.5</i>
<i>(ix) Capital gearing ratio</i>	<i>0.7875</i>
<i>(x) Fixed assets to net worth</i>	<i>1.3 : 1</i>

You are required to PREPARE:

- (a) Balance Sheet of the company on the basis of above details.*

- (b) The statement showing working capital requirement, if the company wants to make a provision for contingencies @15 percent of net working capital.
4. PQ Ltd., a company newly commencing business in 2021-22 has the following projected Profit and Loss Account:

	(₹)	(₹)
Sales		2,10,000
Cost of goods sold		<u>1,53,000</u>
Gross Profit		57,000
Administrative Expenses	14,000	
Selling Expenses	<u>13,000</u>	<u>27,000</u>
Profit before tax		30,000
Provision for taxation		<u>10,000</u>
Profit after tax		<u>20,000</u>
The cost of goods sold has been arrived at as under:		
Materials used	84,000	
Wages and manufacturing Expenses	62,500	
Depreciation	<u>23,500</u>	
	1,70,000	
Less: Stock of Finished goods		
(10% of goods produced not yet sold)	<u>17,000</u>	
		<u>1,53,000</u>

The figure given above relate only to finished goods and not to work-in-progress. Goods equal to 15% of the year's production (in terms of physical units) will be in process on the average requiring full materials but only 40% of the other expenses. The company believes in keeping materials equal to two months' consumption in stock.

All expenses will be paid one month in advance. Suppliers of materials will extend 1-1/2 months credit. Sales will be 20% for cash and the rest at two months' credit. 70% of the Income tax will be paid in advance in quarterly instalments. The company wishes to keep ₹ 8,000 in cash. 10% has to be added to the estimated figure for unforeseen contingencies.

PREPARE an estimate of working capital.

Note: All workings should form part of the answer.

5. *M.A. Limited is commencing a new project for manufacture of a plastic component. The following cost information has been ascertained for annual production of 12,000 units which is the full capacity:*

	Costs per unit (₹)
<i>Materials</i>	40.00
<i>Direct labour and variable expenses</i>	20.00
<i>Fixed manufacturing expenses</i>	6.00
<i>Depreciation</i>	10.00
<i>Fixed administration expenses</i>	4.00
	80.00

The selling price per unit is expected to be ₹ 96 and the selling expenses ₹ 5 per unit, 80% of which is variable.

In the first two years of operations, production and sales are expected to be as follows:

Year	Production (No. of units)	Sales (No. of units)
1	6,000	5,000
2	9,000	8,500

To assess the working capital requirements, the following additional information is available:

- (a) *Stock of materials* 2.25 months' average consumption
 (b) *Work-in-process* Nil

- (c) Debtors 1 month's average sales.
 (d) Cash balance ₹ 10,000
 (e) Creditors for supply of materials 1 month's average purchase during the year.
 (f) Creditors for expenses 1 month's average of all expenses during the year.

PREPARE, for the two years:

- (i) A projected statement of Profit/Loss (Ignoring taxation); and
 (ii) A projected statement of working capital requirements.
6. Aneja Limited, a newly formed company, has applied to a commercial bank for the first time for financing its working capital requirements. The following information is available about the projections for the current year:

Estimated level of activity: 1,04,000 completed units of production plus 4,000 units of work-in-progress. Based on the above activity, estimated cost per unit is:

Raw material	₹ 80 per unit
Direct wages	₹ 30 per unit
Overheads (exclusive of depreciation)	<u>₹ 60 per unit</u>
Total cost	<u>₹ 170 per unit</u>
Selling price	<u>₹ 200 per unit</u>

Raw materials in stock: Average 4 weeks consumption, work-in-progress (assume 50% completion stage in respect of conversion cost) (materials issued at the start of the processing).

Finished goods in stock	8,000 units
Credit allowed by suppliers	Average 4 weeks
Credit allowed to debtors/receivables	Average 8 weeks
Lag in payment of wages	Average 1.5 weeks

Cash at banks (for smooth operation) is expected to be ₹ 25,000.

Assume that production is carried on evenly throughout the year (52 weeks) and wages and overheads accrue similarly. All sales are on credit basis only.

You are required to **CALCULATE** the net working capital required.

7. The management of Trux Company Ltd. is planning to expand its business and consults you to prepare an estimated working capital statement. The records of the company reveals the following annual information:

	(₹)
Sales – Domestic at one month's credit	18,00,000
Export at three month's credit (sales price 10% below domestic price)	8,10,000
Materials used (suppliers extend two months credit)	6,75,000
Lag in payment of wages – ½ month	5,40,000
Lag in payment of manufacturing expenses (cash) – 1 month	7,65,000
Lag in payment of Administration Expenses – 1 month	1,80,000
Selling expenses payable quarterly in advance	1,12,500
Income tax payable in four installments, of which one falls in the next financial year	1,68,000

Rate of gross profit is 20%. Ignore work-in-progress and depreciation.

The company keeps one month's stock of raw materials and finished goods (each) and believes in keeping ₹ 2,50,000 available to it including the overdraft limit of ₹ 75,000 not yet utilized by the company.

The management is also of the opinion to make 10% margin for contingencies on computed figure.

You are required to **PREPARE** the estimated working capital statement for the next year.

8. The following information relates to Zeta Limited, a publishing company:

The selling price of a book is ₹ 15, and sales are made on credit through a book club and invoiced on the last day of the month.

Variable costs of production per book are materials (₹ 5), labour (₹ 4), and overhead (₹ 2)

The sales manager has forecasted the following volumes:

Month	No. of Books
November	1,000
December	1,000
January	1,000
February	1,250
March	1,500
April	2,000
May	1,900
June	2,200
July	2,200
August	2,300

Customers are expected to pay as follows:

One month after the sale	40%
Two months after the sale	60%

The company produces the books two months before they are sold and the creditors for materials are paid two months after production.

Variable overheads are paid in the month following production and are expected to increase by 25% in April; 75% of wages are paid in the month of production and 25% in the following month. A wage increase of 12.5% will take place on 1st March.

The company is going through a restructuring and will sell one of its freehold properties in May for ₹25,000, but it is also planning to buy a new printing press in May for ₹10,000. Depreciation is currently ₹1,000 per month, and will rise to ₹1,500 after the purchase of the new machine.

The company's corporation tax (of ₹10,000) is due for payment in March.

The company presently has a cash balance at bank on 31 December 2021, of ₹1,500.

You are required to PREPARE a cash budget for the six months from January to June, 2022.

9. From the information and the assumption that the cash balance in hand on 1st January 2022 is ₹ 72,500, PREPARE a cash budget.

Assume that 50 per cent of total sales are cash sales. Assets are to be acquired in the months of February and April. Therefore, provisions should be made for the payment of ₹ 8,000 and ₹ 25,000 for the same. An application has been made to the bank for the grant of a loan of ₹ 30,000 and it is hoped that the loan amount will be received in the month of May.

It is anticipated that a dividend of ₹ 35,000 will be paid in June. Debtors are allowed one month's credit. Creditors for materials purchased and overheads grant one month's credit. Sales commission at 3 per cent on sales is paid to the salesman each month.

Month	Sales (₹)	Materials Purchases (₹)	Salaries & Wages (₹)	Production Overheads (₹)	Office and Selling Overheads (₹)
January	72,000	25,000	10,000	6,000	5,500
February	97,000	31,000	12,100	6,300	6,700
March	86,000	25,500	10,600	6,000	7,500
April	88,600	30,600	25,000	6,500	8,900
May	1,02,500	37,000	22,000	8,000	11,000
June	1,08,700	38,800	23,000	8,200	11,500

10. Consider the balance sheet of Maya Limited as on 31 December, 2022. The company has received a large order and anticipates the need to go to its bank to increase its borrowings. As a result, it has to forecast its cash requirements for January, February and March, 2023. Typically, the company collects 20 per cent of its sales in the month of sale, 70 per cent in the subsequent month, and 10 per cent in the second month after the sale. All sales are credit sales.

Equity & liabilities	Amount (₹ in '000)	Assets	Amount (₹ in '000)
Equity shares capital	100	Net fixed assets	1,836
Retained earnings	1,439	Inventories	545
Long-term borrowings	450	Accounts receivables	530

Accounts payables	360	Cash and bank	50
Loan from banks	400		
Other liabilities	212		
	2,961		2,961

Purchases of raw materials are made in the month prior to the sale and amounts to 60 per cent of sales. Payments for these purchases occur in the month after the purchase. Labour costs, including overtime, are expected to be ₹ 1,50,000 in January, ₹ 2,00,000 in February, and ₹ 1,60,000 in March. Selling, administrative, taxes, and other cash expenses are expected to be ₹ 1,00,000 per month for January through March. Actual sales in November and December and projected sales for January through April are as follows (in thousands):

Month	₹	Month	₹	Month	₹
November	500	January	600	March	650
December	600	February	1,000	April	750

On the basis of this information:

- (a) PREPARE a cash budget and DETERMINE the amount of additional bank borrowings necessary to maintain a cash balance of ₹ 50,000 at all times for the months of January, February, and March.
 - (b) PREPARE a pro forma balance sheet for March 31.
11. PQR Ltd. having an annual sales of ₹ 30 lakhs, is re-considering its present collection policy. At present, the average collection period is 50 days and the bad debt losses are 5% of sales. The company is incurring an expenditure of ₹ 30,000 on account of collection of receivables. Cost of funds is 10 percent.

The alternative policies are as under:

	Alternative I	Alternative II
Average Collection Period	40 days	30 days
Bad Debt Losses	4% of sales	3% of sales
Collection Expenses	₹ 60,000	₹ 95,000

DETERMINE the alternatives on the basis of incremental approach and state which alternative is more beneficial.

12. As a part of the strategy to increase sales and profits, the sales manager of a company proposes to sell goods to a group of new customers with 10% risk of non-payment. This group would require one and a half months credit and is likely to increase sales by ₹ 1,00,000 p.a. Production and Selling expenses amount to 80% of sales and the income-tax rate is 50%. The company's minimum required rate of return (after tax) is 25%.

Should the sales manager's proposal be accepted? ANALYSE

Also COMPUTE the degree of risk of non-payment that the company should be willing to assume if the required rate of return (after tax) were (i) 30%, (ii) 40% and (iii) 60%.

13. Slow Payers are regular customers of Goods Dealers Ltd. and have approached the sellers for extension of credit facility for enabling them to purchase goods. On an analysis of past performance and on the basis of information supplied, the following pattern of payment schedule emerges in regard to Slow Payers:

Pattern of Payment Schedule	
At the end of 30 days	15% of the bill
At the end of 60 days	34% of the bill
At the end of 90 days	30% of the bill
At the end of 100 days	20% of the bill
Non-recovery	1% of the bill

Slow Payers want to enter into a firm commitment for purchase of goods of ₹ 15 lakhs in 2021-22, deliveries to be made in equal quantities on the first day of each quarter in the calendar year. The price per unit of commodity is ₹ 150 on which a profit of ₹ 5 per unit is expected to be made. It is anticipated by Goods Dealers Ltd., that taking up of this contract would mean an extra recurring expenditure of ₹ 5,000 per annum. If the opportunity cost of funds in the hands of Goods Dealers is 24% per annum, would you as the finance manager of the seller recommend the grant of credit to Slow Payers? ANALYSE. Workings should form part of your answer. Assume year of 365 days.

14. PREPARE a working capital estimate to finance an activity level of 52,000 units a year (52 weeks) based on the following data:

Raw Materials	- ₹ 400 per unit
Direct Wages	- ₹ 150 per unit

Overheads (Manufacturing) - ₹200 per unit

Overheads (Selling & Distribution) - ₹100 per unit

Selling Price - ₹1,000 per unit, Raw materials & Finished Goods remain in stock for 4 weeks, Work in process takes 4 weeks. Debtors are allowed 8 weeks for payment whereas creditors allow us 4 weeks. Finished goods are valued at cost of sales.

Minimum cash balance expected is ₹50,000. Receivables are valued at Selling Price.

Case Scenarios

1. ArMore LLP is a newly established startup dealing in manufacture of a revolutionary product HDHMR which is a substitute to conventional wood and plywood. It is an economical substitute for manufacture of furniture and home furnishing. It has been asked by a venture capitalist for an estimated amount of funds required for setting up plant and also the amount of circulating capital required. A consultant hired by the entity has advised that the cost of setting up the plant would be ₹5 Crores and it will require 1 year to make the plant operational. The anticipated revenue and associated cost numbers are as follows:

Units to be sold = 3 lakh sq metres p.a.

Sale Price of each sq mtr = ₹1000

Raw Material cost = ₹200 per sq mtr

Labour cost = ₹50 per hour

Labour hours per sq mtr = 3 hours

Cash Manufacturing Overheads = ₹75 per machine hour

Machine hours per sq mtr = 2 hours

Selling and credit administration Overheads = ₹250 per sq mtr

Being a new product in the industry, the firm will have to give a longer credit period of 3 months to its customers. It will maintain a stock of raw material equal to 15% of annual consumption. Based on negotiation with the creditors, the payment period has been agreed to be 1 month from the date of purchase. The entity will hold finished goods equal to 2 months of units to be sold. All

other expenses are to be paid one month in arrears. Cash and Bank balance to the tune of ₹ 25,00,000 is required to be maintained.

The entity is also considering reducing the working capital requirement by either of the two options: a) reducing the credit period to customers by a month which will lead to reduction in sales by 5%. b) Engaging with a factor for managing the receivables, who will charge a commission of 2% of invoice value and will also advance 65% of receivables @ 12% p.a. This will lead to savings in administration and bad debts cost to the extent of ₹ 20 lakhs and 16 lakhs respectively.

The entity is also considering funding a part of working capital by bank loan. For this purpose, bank has stipulated that it will grant 75% of net current assets as advance against working capital. The bank has quoted 16.5% rate of interest with a condition of opening a current account with it, which will require 10% of loan amount to be minimum average balance.

You being an finance manager, has been asked the following questions:

- (i) *The anticipated profit before tax per annum after the plant is operational is*
- (a) ₹ 750 Lakhs
 - (b) ₹ 570 Lakhs
 - (c) ₹ 370 Lakhs
 - (d) ₹ 525 Lakhs
- (ii) *The estimated current assets requirement in the first year of operation (debtors calculated at cost) is*
- (a) ₹ 9,42,50,000
 - (b) ₹ 2,17,08,333
 - (c) ₹ 7,25,41,667
 - (d) ₹ 67,08,333
- (iii) *The net working capital requirement for the first year of operation is*
- (a) ₹ 9,42,50,000
 - (b) ₹ 2,17,08,333
 - (c) ₹ 7,25,41,667
 - (d) ₹ 67,08,333

- (iv) *The annualised % cost of two options for reducing the working capital is*
- (a) 18.18% and 16.92%
 - (b) 18.33% and 16.92%
 - (c) 18.59% and 18.33%
 - (d) 16.92% and 19.05%
- (v) *What will be the Maximum Permissible Bank Finance by the bank and annualised % cost of the same?*
- (a) ₹4,55,03,630 and 18.33%
 - (b) ₹5,44,06,250 and 18.33%
 - (c) ₹4,45,86,025 and 18.59%
 - (d) ₹3,45,89,020 and 19.85%

ANSWERS/SOLUTIONS

Answers to the MCQs

1.	(a)	2.	(c)	3.	(c)	4.	(c)	5.	(b)	6.	(a)
7.	(a)	8.	(a)	9.	(b)	10.	(c)	11.	(a)	12.	(b)
13.	(a)	14.	(a)	15.	(b)	16.	(a)	17.	(a)	18.	(a)
19.	(b)	20.	(c)	21.	(a)	22.	(a)	23.	(a)	24.	(b)
25.	(b)										

Answers to the Theoretical Questions

1. Please refer paragraph 9.3
2. Please refer paragraph 9.4.1
3. Please refer paragraph 9.5
4. Please refer paragraph 9.8
5. Please refer paragraph 9.11.1
6. Please refer paragraph 9.12.6

7. Please refer paragraph 9.11.1
8. Please refer paragraph 9.11.2
9. Please refer paragraph 9.21
10. Please refer paragraph 9.20
11. Please refer paragraph 9.29

Answers to the Practical Problems

1. Working Notes:

1. Raw Material Storage Period (R)

$$= \frac{\text{Average Stock of Raw Material}}{\text{Annual Consumption of Raw Material}} \times 365$$

$$= \frac{\frac{₹45 + ₹65}{2}}{₹380} \times 365 = 52.83 \text{ or } 53 \text{ days}$$

Annual Consumption of Raw Material = Opening Stock + Purchases - Closing Stock

$$= ₹45 + ₹400 - ₹65 = ₹380 \text{ lakh}$$

2. Work – in - Progress (WIP) Conversion Period (W)

$$= \frac{\text{Average Stock of WIP}}{\text{Annual Cost of Production}} \times 365$$

$$= \frac{\frac{₹35 + ₹51}{2}}{₹450} \times 365 = 34.87 \text{ or } 35 \text{ days}$$

3. Finished Stock Storage Period (F)

$$= \frac{\text{Average Stock of Finished Goods}}{\text{Cost of Goods Sold}} \times 365$$

$$= \frac{\frac{₹60 + ₹70}{2}}{₹525} \times 365 = 45.19 \text{ or } 45 \text{ days.}$$

4. **Receivables (Debtors) Collection Period (D)**

$$= \frac{\text{Average Receivables}}{\text{Annual Credit Sales}} \times 365$$

$$= \frac{\frac{₹112 + ₹135}{2}}{₹585} \times 365 = 77.05 \text{ or } 77 \text{ days}$$

5. **Payables (Creditors) Payment Period (C)**

$$= \frac{\text{Average Payables for materials}}{\text{Annual Credit purchases}} \times 365$$

$$= \frac{\frac{₹68 + ₹71}{2}}{₹400} \times 365 = 63.41 \text{ or } 64 \text{ days}$$

(i) **Net Operating Cycle Period**

$$= R + W + F + D - C$$

$$= 53 + 35 + 45 + 77 - 64 = 146 \text{ days}$$

(ii) **Number of Operating Cycles in the Year**

$$= \frac{365}{\text{Operating Cycle Period}} = \frac{365}{146} = 2.5 \text{ times}$$

(iii) **Amount of Working Capital Required**

$$= \frac{\text{Annual Operating Cost}}{\text{Number of Operating Cycles}} = \frac{₹ 325}{2.50} = ₹ 130 \text{ lakh}$$

2. Since WIP is 100% complete in terms of material and 50% complete in terms of other cost, the same has been considered for number of days for WIP inventory i.e. 10 days for material and 5 days for other costs respectively.

Particulars	For Raw Material	For Other Costs	Total
Cash Operating expenses	$\frac{75}{100} \times 800 = 600$	$\frac{25}{100} \times 800 = 200$	800.00
Raw Material Stock Holding	$\frac{20}{360} \times 600 = 33.33$	-	33.33

WIP Conversion	$\frac{10}{360} \times 600 = 16.67$	$\frac{5}{360} \times 200 = 2.78$	19.45
Finished Goods Stock Holding	$\frac{45}{360} \times 600 = 75$	$\frac{45}{360} \times 200 = 25$	100.00
Receivable Collection Period	$\frac{30}{360} \times 600 = 50$	$\frac{30}{360} \times 200 = 16.67$	66.67
Advance to suppliers	$\frac{5}{360} \times 600 = 8.33$	-	8.33
Credit Period from suppliers	$\frac{60}{360} \times 600 = 100$	-	100.00

Computation of working capital

	₹ in lakhs
Raw Material Stock	33.33
WIP	19.45
Finished Goods stock	100.00
Receivables	66.67
Advance to Suppliers	8.33
Cash	10.00
	237.78
Less: Payables (Creditors)	100.00
Working capital	133.78

3. Working Notes:

- (i) Cost of Goods Sold = Sales – Gross Profit (35% of Sales)
= ₹ 90,00,000 – ₹ 31,50,000
= ₹ 58,50,000
- (ii) Closing Stock = Cost of Goods Sold / Stock Turnover
= ₹ 58,50,000/6 = ₹ 9,75,000

$$\begin{aligned}
 \text{(iii) Fixed Assets} &= \text{Cost of Goods Sold} / \text{Fixed Assets Turnover} \\
 &= ₹ 58,50,000 / 1.5 \\
 &= ₹ 39,00,000
 \end{aligned}$$

(iv) Current Assets and Current Liabilities

Current Ratio = 2.5 and Liquid Ratio = 1.5

$$\text{CA} / \text{CL} = 2.5 \quad \dots \text{(i)}$$

$$(\text{CA} - \text{Inventories}) / \text{CL} = 1.5 \quad \dots \text{(ii)}$$

By subtracting equation (ii) from (i), we get,

$$\text{Inventories} / \text{CL} = 1$$

$$\text{Current Liabilities} = \text{Inventories (stock)} = ₹ 9,75,000$$

$$\therefore \text{Current Assets} = ₹ 9,75,000 \times 2.5 = ₹ 24,37,500$$

Or

Current Ratio / Quick Ratio = Current Assets / Quick Assets

$$2.5 / 1.5 = \text{Current Assets} / (\text{Current Assets} - \text{Inventory})$$

$$2.5/1.5 \text{ Current Assets} - 2.5/1.5 \times ₹ 9,75,000 = \text{Current Assets}$$

$$\text{Hence, Current Assets} = ₹ 24,37,500$$

(v) Liquid Assets (Receivables and Cash)

$$= \text{Current Assets} - \text{Inventories (Stock)}$$

$$= ₹ 24,37,500 - ₹ 9,75,000$$

$$= ₹ 14,62,500$$

(vi) Receivables (Debtors) = Sales × Debtors Collection period / 12

$$= ₹ 90,00,000 \times 1/12$$

$$= ₹ 7,50,000$$

(vii) Cash = Liquid Assets – Receivables (Debtors)

$$= ₹ 14,62,500 - ₹ 7,50,000 = ₹ 7,12,500$$

(viii) Net worth = Fixed Assets / 1.3

$$= ₹ 39,00,000 / 1.3 = ₹ 30,00,000$$

(ix) Reserves and Surplus

Reserves and Surplus / Share Capital = 1/1.5

Share Capital = 1.5 Reserves and Surplus ... (i)

Now, Reserves and Surplus + Share Capital = Net worth ... (ii)

From (i) and (ii), we get,

2.5 Reserves and Surplus = Net worth

Reserves and Surplus = ₹ 30,00,000 / 2.5 = ₹ 12,00,000

(x) Share Capital = Net worth – Reserves and Surplus

= ₹ 30,00,000 – ₹ 12,00,000

= ₹ 18,00,000

(xi) Long-term Debts

Capital Gearing Ratio = Long-term Debts / Equity Shareholders' Fund

Long-term Debts = ₹ 30,00,000 × 0.7875 = ₹ 23,62,500

(a) Balance Sheet of the Company

Particulars	Figures as the end of 31-03-2021 (₹)	Figures as the end of 31-03-2020 (₹)
I. EQUITY AND LIABILITIES		
Shareholders' funds		
(a) Share capital	18,00,000	-
(b) Reserves and surplus	12,00,000	-
Non-current liabilities		
(a) Long-term borrowings	23,62,500	-
Current liabilities	9,75,000	-
TOTAL	63,37,500	-
II. ASSETS		
Non-current assets		
Fixed assets	39,00,000	-

Current assets		
Inventories	9,75,000	-
Trade receivables	7,50,000	-
Cash and cash equivalents	7,12,500	-
TOTAL	63,37,500	-

(b) Statement Showing Working Capital Requirement

	(₹)	(₹)
A. Current Assets		
(i) Inventories (Stocks)		9,75,000
(ii) Receivables (Debtors)		7,50,000
(iii) Cash in hand & at bank		7,12,500
Total Current Assets		24,37,500
B. Current Liabilities:		
Total Current Liabilities		9,75,000
Net Working Capital (A – B)		14,62,500
Add: Provision for contingencies (15% of Net Working Capital)		2,19,375
Working capital requirement		16,81,875

4. Statement showing the requirements of Working Capital

Particulars	(₹)	(₹)
A. Current Assets:		
Inventory:		
Stock of Raw material (₹ 96,600 × 2/12)	16,100	
Stock of Work-in-progress (As per Working Note)	16,350	
Stock of Finished goods (₹ 1,46,500 × 10/100)	14,650	
Receivables (Debtors) (₹1,27,080 × 2/12)	21,180	
Cash in Hand	8,000	
Prepaid Expenses:		

Wages & Mfg. Expenses ($\text{₹ } 66,250 \times 1/12$)	5,521	
Administrative expenses ($\text{₹ } 14,000 \times 1/12$)	1,167	
Selling & Distribution Expenses ($\text{₹ } 13,000 \times 1/12$)	1,083	
Advance taxes paid $\{(70\% \text{ of } \text{₹ } 10,000) \times 3/12\}$	1,750	
Gross Working Capital	85,801	85,801
B. Current Liabilities:		
Payables for Raw materials ($\text{₹ } 1,12,700 \times 1.5/12$)	14,088	
Provision for Taxation (Net of Advance Tax) ($\text{₹ } 10,000 \times 30/100$)	3,000	
Total Current Liabilities	17,088	17,088
C. Excess of CA over CL		68,713
Add: 10% for unforeseen contingencies		6,871
Net Working Capital requirements		75,584

Working Notes:**(i) Calculation of Stock of Work-in-progress**

Particulars	(₹)
Raw Material ($\text{₹ } 84,000 \times 15\%$)	12,600
Wages & Mfg. Expenses ($\text{₹ } 62,500 \times 15\% \times 40\%$)	3,750
Total	16,350

(ii) Calculation of Stock of Finished Goods and Cost of Sales

Particulars	(₹)
Direct material Cost [$\text{₹ } 84,000 + \text{₹ } 12,600$]	96,600
Wages & Mfg. Expenses [$\text{₹ } 62,500 + \text{₹ } 3,750$]	66,250
Depreciation	0
Gross Factory Cost	1,62,850
Less: Closing W.I.P	(16,350)
Cost of goods produced	1,46,500

Add: Administrative Expenses	14,000
	1,60,500
Less: Closing stock	(14,650)
Cost of Goods Sold	1,45,850
Add: Selling and Distribution Expenses	13,000
Total Cash Cost of Sales	1,58,850
Debtors (80% of cash cost of sales)	1,27,080

(iii) Calculation of Credit Purchase

Particulars	(₹)
Raw material consumed	96,600
Add: Closing Stock	16,100
Less: Opening Stock	-
Purchases	1,12,700

5. (i)

M.A. Limited
Projected Statement of Profit / Loss
(Ignoring Taxation)

	Year 1	Year 2
Production (Units)	6,000	9,000
Sales (Units)	5,000	8,500
	(₹)	(₹)
Sales revenue (A) (Sales unit × ₹ 96)	4,80,000	8,16,000
Cost of production:		
Materials cost (Units produced × ₹ 40)	2,40,000	3,60,000
Direct labour and variable expenses (Units produced × ₹ 20)	1,20,000	1,80,000
Fixed manufacturing expenses (Production Capacity: 12,000 units × ₹ 6)	72,000	72,000
Depreciation	1,20,000	1,20,000

(Production Capacity : 12,000 units × ₹ 10)		
Fixed administration expenses (Production Capacity : 12,000 units × ₹ 4)	48,000	48,000
Total Costs of Production	6,00,000	7,80,000
Add: Opening stock of finished goods (Year 1 : Nil; Year 2 : 1,000 units)	---	1,00,000
Cost of Goods available for sale (Year 1: 6,000 units; Year 2: 10,000 units)	6,00,000	8,80,000
Less: Closing stock of finished goods at average cost (year 1: 1000 units, year 2 : 1500 units) (Cost of Production × Closing stock/ units produced)	(1,00,000)	(1,32,000)
Cost of Goods Sold	5,00,000	7,48,000
Add: Selling expenses – Variable (Sales unit × ₹ 4)	20,000	34,000
Add: Selling expenses -Fixed (12,000 units × ₹ 1)	12,000	12,000
Cost of Sales : (B)	5,32,000	7,94,000
Profit (+) / Loss (-): (A - B)	(-) 52,000	(+) 22,000

Note: Value of closing stock valued at average cost of goods available for sale.

Working Notes:

1. Calculation of creditors for supply of materials:

	Year 1 (₹)	Year 2 (₹)
Materials consumed during the year	2,40,000	3,60,000
Add: Closing stock (2.25 month's average consumption)	45,000	67,500
	2,85,000	4,27,500
Less: Opening Stock	---	45,000
Purchases during the year	2,85,000	3,82,500

Average purchases per month (Creditors)	23,750	31,875
---	--------	--------

2. Creditors for expenses:

	Year 1 (₹)	Year 2 (₹)
Direct labour and variable expenses	1,20,000	1,80,000
Fixed manufacturing expenses	72,000	72,000
Fixed administration expenses	48,000	48,000
Selling expenses (variable + fixed)	32,000	46,000
Total (including	2,72,000	3,46,000
Average per month	22,667	28,833

(ii) Projected Statement of Working Capital requirements

	Year 1 (₹)	Year 2 (₹)
Current Assets:		
Inventories:		
- Stock of materials (2.25 month's average consumption)	45,000	67,500
- Finished goods	1,00,000	1,32,000
Debtors (1 month's average sales) (including profit)	40,000	68,000
Cash	10,000	10,000
Total Current Assets/ Gross working capital (A)	1,95,000	2,77,500
Current Liabilities:		
Creditors for supply of materials (Refer to working note 1)	23,750	31,875
Creditors for expenses (Refer to working note 2)	22,667	28,833
Total Current Liabilities: (B)	46,417	60,708
Estimated Working Capital Requirements: (A-B)	1,48,583	2,16,792

**Projected Statement of Working Capital Requirement
(Cash Cost Basis)**

	Year 1 (₹)	Year 2 (₹)
(A) Current Assets		
Inventories:		
- Stock of Raw Material (6,000 units × ₹ 40 × 2.25/12); (9,000 units × ₹ 40 × 2.25 /12)	45,000	67,500
- Finished Goods (Refer working note 3)	80,000	1,11,000
Receivables (Debtors) (Refer working note 4)	36,000	56,250
Minimum Cash balance	10,000	10,000
Total Current Assets/ Gross working capital (A)	1,71,000	2,44,750
(B) Current Liabilities		
Creditors for raw material (Refer working note 1)	23,750	31,875
Creditors for Expenses (Refer working note 2)	22,667	28,833
Total Current Liabilities	46,417	60,708
Net Working Capital (A – B)	1,24,583	1,84,042

Working Note:

3. Cash Cost of Production:

	Year 1 (₹)	Year 2 (₹)
Cost of Production as per projected Statement of P&L	6,00,000	7,80,000
Less: Depreciation	1,20,000	1,20,000
Cash Cost of Production	4,80,000	6,60,000
Add: Opening Stock at Average Cost:	--	80,000
Cash Cost of Goods Available for sale	4,80,000	7,40,000
Less : Closing Stock at Avg. Cost	(80,000)	(1,11,000)

$\left(\frac{₹ 4,80,000 \times 1,000}{6,000} \right); \left(\frac{₹ 7,40,000 \times 1,500}{10,000} \right)$		
Cash Cost of Goods Sold	4,00,000	6,29,000

4. Receivables (Debtors)

	Year 1 (₹)	Year 2 (₹)
Cash Cost of Goods Sold	4,00,000	6,29,000
Add : Variable Expenses @ ₹ 4	20,000	34,000
Add : Total Fixed Selling expenses (12,000 units × ₹1)	12,000	12,000
Cash Cost of Debtors	4,32,000	6,75,000
Average Debtors	36,000	56,250

6. Calculation of Net Working Capital requirement:

	(₹)	(₹)
A. Current Assets:		
Inventories:		
- Raw material stock (Refer to Working note 3)	6,64,615	
- Work in progress stock (Refer to Working note 2)	5,00,000	
- Finished goods stock (Refer to Working note 4)	13,60,000	
Receivables (Debtors) (Refer to Working note 5)	25,10,769	
Cash and Bank balance	25,000	
Gross Working Capital	50,60,384	50,60,384
B. Current Liabilities:		
Creditors for raw materials	7,15,740	

(Refer to Working note 6)		
Creditors for wages (Refer to Working note 7)	91,731	
	8,07,471	8,07,471
Net Working Capital (A - B)		42,52,913

Working Notes:**1. Annual cost of production**

	(₹)
Raw material requirements {(1,04,000 units × ₹ 80) + ₹3,20,000}	86,40,000
Direct wages {(1,04,000 units × ₹ 30) + ₹60,000}	31,80,000
Overheads (exclusive of depreciation) {(1,04,000 × ₹ 60) + ₹1,20,000}	63,60,000
Gross Factory Cost	1,81,80,000
Less: Closing W.I.P	(5,00,000)
Cost of Goods Produced	1,76,80,000
Less: Closing Stock of Finished Goods (₹1,76,80,000 × 8,000/1,04,000)	(13,60,000)
Total Cash Cost of Sales	1,63,20,000

2. Work in progress stock

	(₹)
Raw material requirements (4,000 units × ₹ 80)	3,20,000
Direct wages (50% × 4,000 units × ₹ 30)	60,000
Overheads (50% × 4,000 units × ₹ 60)	1,20,000
	5,00,000

3. **Raw material stock**

It is given that raw material in stock is average 4 weeks consumption. Since, the company is newly formed, the raw material requirement for production and work in progress will be issued and consumed during the year.

Hence, the raw material consumption for the year (52 weeks) is as follows:

	(₹)
For Finished goods (1,04,000 × ₹ 80)	83,20,000
For Work in progress (4,000 × ₹ 80)	3,20,000
	86,40,000

$$\text{Raw material stock} = \frac{\text{₹ } 86,40,000}{52 \text{ weeks}} \times 4 \text{ weeks} \quad \text{i.e. ₹ } 6,64,615$$

4. **Finished goods stock:** 8,000 units @ ₹ 170 per unit = ₹ 13,60,000

5. **Debtors for sale:** $1,63,20,000 \times \frac{8}{52} = ₹ 25,10,769$

6. **Creditors for raw material:**

Material Consumed (₹ 83,20,000 + ₹ 3,20,000)	₹ 86,40,000
Add: Closing stock of raw material	<u>₹ 6,64,615</u>
Purchases of Raw Material	<u>₹ 93,04,615</u>

$$\text{Credit allowed by suppliers} = \frac{\text{₹ } 93,04,615}{52 \text{ weeks}} \times 4 \text{ weeks} = ₹ 7,15,740$$

7. **Creditors for wages**

$$\text{Outstanding wage payment} = \frac{\text{₹ } 31,80,000}{52 \text{ weeks}} \times 1.5 \text{ weeks} = ₹ 91,731$$

7. Preparation of Statement of Working Capital Requirement for Trux Company Ltd.

	(₹)	(₹)
A. Current Assets		
(i) Inventories:		
Material (1 month) $\left(\frac{₹ 6,75,000}{12 \text{ months}} \times 1 \text{ month} \right)$	56,250	
Finished goods (1 month) $\left(\frac{₹ 21,60,000}{12 \text{ months}} \times 1 \text{ month} \right)$	1,80,000	2,36,250
(ii) Receivables (Debtors)		
For Domestic Sales $\left(\frac{₹ 15,17,586}{12 \text{ months}} \times 1 \text{ month} \right)$	1,26,466	
For Export Sales $\left(\frac{₹ 7,54,914}{12 \text{ months}} \times 3 \text{ months} \right)$	1,88,729	3,15,195
(iii) Prepayment of Selling expenses $\left(\frac{₹ 1,12,500}{12 \text{ months}} \times 3 \text{ months} \right)$		28,125
(iii) Cash in hand & at bank (net of overdraft)		1,75,000
Total Current Assets		7,54,570
B. Current Liabilities:		
(i) Payables (Creditors) for materials (2 months) $\left(\frac{₹ 6,75,000}{12 \text{ months}} \times 2 \text{ month} \right)$		1,12,500

(ii) Outstanding wages (0.5 months)		
$\left(\frac{₹5,40,000}{12\text{months}} \times 0.5\text{month} \right)$		22,500
(iii) Outstanding manufacturing expenses		
$\left(\frac{₹7,65,000}{12\text{months}} \times 1\text{month} \right)$		63,750
(iv) Outstanding administrative expenses		
$\left(\frac{₹1,80,000}{12\text{months}} \times 1\text{month} \right)$		15,000
(v) Income tax payable		42,000
Total Current Liabilities		2,55,750
Net Working Capital (A – B)		4,98,820
Add: 10% contingency margin		49,882
Total Working Capital required		5,48,702

Working Notes:**1. Calculation of Cost of Goods Sold and Cost of Sales**

	Domestic (₹)	Export (₹)	Total (₹)
Domestic Sales	18,00,000	8,10,000	26,10,000
Less: Gross profit @ 20% on domestic sales and 11.11% on export sales (Working note-2)	3,60,000	90,000	4,50,000
Cost of Goods Sold	14,40,000	7,20,000	21,60,000
Add: Selling expenses (Working note-3)	77,586	34,914	1,12,500
Cash Cost of Sales	15,17,586	7,54,914	22,72,500

2. Calculation of gross profit on Export Sales

Let domestic selling price is ₹ 100. Gross profit is ₹ 20, and then cost per unit is ₹ 80

Export price is 10% less than the domestic price i.e. ₹ 100 – (1 – 0.1) = ₹ 90

Now, gross profit will be = ₹ 90 – ₹ 80 = ₹ 10

So, Gross profit ratio at export price will be = $\frac{₹ 10}{₹ 90} \times 100 = 11.11\%$

3. Apportionment of Selling expenses between Domestic and Exports sales:

Apportionment on the basis of sales value:

$$\text{Domestic Sales} = \frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 18,00,000 = ₹ 77,586$$

$$\text{Exports Sales} = \frac{₹ 1,12,500}{₹ 26,10,000} \times ₹ 8,10,000 = ₹ 34,914$$

4. Assumptions

- (i) It is assumed that administrative expenses is related to production activities.
- (ii) Value of opening and closing stocks are equal.

8. Workings:**1. Sale receipts**

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Forecast sales (S)	1,000	1,000	1,000	1,250	1,500	2,000	1,900	2,200
	₹	₹	₹	₹	₹	₹	₹	₹
S × 15	15,000	15,000	15,000	18,750	22,500	30,000	28,500	33,000
Debtors pay:								
1 month 40%		6,000	6,000	6,000	7,500	9,000	12,000	11,400
2 month 60%		-	9,000	9,000	9,000	11,250	13,500	18,000
	-	-	15,000	15,000	16,500	20,250	25,500	29,400

2. Payment for materials – books produced two months before sale

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹	₹
Materials (Q×5)	5,000	6,250	7,500	10,000	9,500	11,000	11,000	11,500
Paid (2 months after)	-	-	5,000	6,250	7,500	10,000	9,500	11,000

3. Variable overheads

Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,000	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹	₹
Var. overhead (Q×2)	2,000	2,500	3,000	4,000	3,800			
Var. overhead (Q×2.50)						5,500	5,500	5,750
Paid one month later		2,000	2,500	3,000	4,000	3,800	5,500	5,500

4. Wages payments

Month	Dec	Jan	Feb	Mar	Apr	May	Jun
Qty produced (Q)	1,250	1,500	2,000	1,900	2,200	2,200	2,300
	₹	₹	₹	₹	₹	₹	₹
Wages (Q × 4)	5,000	6,000	8,000				
Wages (Q × 4.50)				8,550	9,900	9,900	10,350
75% this month	3,750	4,500	6,000	6,412	7,425	7,425	7,762
25% this month		1,250	1,500	2,000	2,138	2,475	2,475
		5,750	7,500	8,412	9,563	9,900	10,237

Cash budget – six months ended June

	Jan	Feb	Mar	Apr	May	Jun
	₹	₹	₹	₹	₹	₹
Receipts:						
Sales receipts	15,000	15,000	16,500	20,250	25,500	29,400
Freehold property	-	-	-	-	25,000	-
	15,000	15,000	16,500	20,250	50,500	29,400
Payments:						
Materials	5,000	6,250	7,500	10,000	9,500	11,000
Var. overheads	2,500	3,000	4,000	3,800	5,500	5,500
Wages	5,750	7,500	8,412	9,563	9,900	10,237
Printing press	-	-	-	-	10,000	-
Corporation tax	-	-	10,000	-	-	-
	13,250	16,750	29,912	23,363	34,900	26,737
Net cash flow	1,750	(1,750)	(13,412)	(3,113)	15,600	2,663
Balance b/f	1,500	3,250	1,500	(11,912)	(15,025)	575
Cumulative cash flow	3,250	1,500	(11,912)	(15,025)	575	3,238

9. Cash Budget

	Jan ₹	Feb ₹	Mar ₹	Apr ₹	May ₹	June ₹	Total ₹
Receipts							
Cash sales	36,000	48,500	43,000	44,300	51,250	54,350	2,77,400
Collections from debtors	-	36,000	48,500	43,000	44,300	51,250	2,23,050
Bank loan	-	-	-	-	30,000	-	30,000
Total	36,000	84,500	91,500	87,300	1,25,550	1,05,600	5,30,450

Payments							
Materials	-	25,000	31,000	25,500	30,600	37,000	1,49,100
Salaries and wages	10,000	12,100	10,600	25,000	22,000	23,000	1,02,700
Production overheads	-	6,000	6,300	6,000	6,500	8,000	32,800
Office & selling overheads	-	5,500	6,700	7,500	8,900	11,000	39,600
Sales commission	2,160	2,910	2,580	2,658	3,075	3,261	16,644
Capital expenditure	-	8,000	-	25,000	-	-	33,000
Dividend	-	-	-	-	-	35,000	35,000
Total	12,160	59,510	57,180	91,658	71,075	1,17,261	4,08,844
Net cash flow	23,840	24,990	34,320	(4,358)	54,475	(11,661)	1,21,606
Balance, beginning of month	72,500	96,340	1,21,330	1,55,650	1,51,292	2,05,767	72,500
Balance, end of month	96,340	1,21,330	1,55,650	1,51,292	2,05,767	1,94,106	1,94,196

10. (a)**Cash Budget***(in thousands)*

	Nov.	Dec.	Jan.	Feb.	Mar.
	₹	₹	₹	₹	₹
Opening Balance (A)			50	50	50
Sales	500	600	600	1,000	650
Receipts:					
Collections, current month's sales			120	200	130
Collections, previous month's sales			420	420	700
Collections, previous 2 month's sales			50	60	60
Total (B)			590	680	890
Purchases		360	600	390	450
Payments:					
Payment for purchases			360	600	390

Labour costs			150	200	160
Other expenses			100	100	100
Total (C)			610	900	650
Surplus/Deficit (D) = (A + B – C)			30	(170)	290
Minimum cash balance (E)			50	50	50
Additional borrowings (F) = (E - D)			20	220	(240)

	Jan.	Feb.	Mar.
	₹	₹	₹
Additional borrowings	20	220	(240)
Cumulative borrowings (Opening balance of 400)	420	640	400

The amount of financing peaks in February owing to the need to pay for purchases made the previous month and higher labour costs. In March, substantial collections are made on the prior month's billings, causing large net cash inflow sufficient to pay off the additional borrowings.

(b) Pro forma Balance Sheet, 31st March, 2023

Equity & liabilities	Amount (₹ in '000)	Assets	Amount (₹ in '000)
Equity shares capital	100	Net fixed assets	1,836
Retained earnings	1,529	Inventories	635
Long-term borrowings	450	Accounts receivables	620
Accounts payables	450	Cash and bank	50
Loan from banks	400		
Other liabilities	212		
	3,141		3,141

Accounts receivable = Sales in March × 0.8 + Sales in February × 0.1

$$= ₹ 650 \times 0.8 + ₹ 1,000 \times 0.1 = ₹ 620$$

$$\begin{aligned} \text{Inventories} &= ₹ 545 + \text{Total purchases from January to March} - \text{Total sales from January to March} \times 0.6 \\ &= ₹ 545 + (₹ 600 + ₹ 390 + ₹ 450) - (₹ 600 + ₹ 1000 + ₹ 650) \times 0.6 = ₹ 635 \end{aligned}$$

$$\text{Accounts payable} = \text{Purchases in March} = ₹ 450$$

$$\begin{aligned} \text{Retained earnings} &= ₹ 1,439 + \text{Sales} - \text{Payment for purchases} - \text{Labour costs} - \text{Other expenses, all for January to March} \\ &= ₹ 1,439 + (₹ 600 + ₹ 1000 + ₹ 650) - (₹ 360 + ₹ 600 + ₹ 390) - (₹ 150 + ₹ 200 + ₹ 160) - (₹ 100 + ₹ 100 + ₹ 100) = ₹ 1,529 \end{aligned}$$

11. Evaluation of Alternative Collection Programmes

	Present Policy	Alternative I	Alternative II
	₹	₹	₹
Sales Revenues	30,00,000	30,00,000	30,00,000
Average Collection Period (ACP) (days)	50	40	30
Receivables (₹) $\left(\text{Sales} \times \frac{\text{ACP}}{360} \right)$	4,16,667	3,33,333	2,50,000
Reduction in Receivables from Present Level (₹)	–	83,334	1,66,667
Savings in Interest @ 10% p.a. (A)	–	₹ 8,333	₹ 16,667
% of Bad Debt Loss	5%	4%	3%
Amount (₹)	1,50,000	1,20,000	90,000
Reduction in Bad Debts from Present Level (B)	–	30,000	60,000

Incremental Benefits from Present Level (C) = (A) + (B)	–	38,333	76,667
Collection Expenses (₹)	30,000	60,000	95,000
Incremental Collection Expenses from Present Level (D)	–	<u>30,000</u>	<u>65,000</u>
Incremental Net Benefit (C – D)	–	<u>₹ 8,333</u>	<u>₹ 11,667</u>

Conclusion: From the analysis it is apparent that Alternative I has a benefit of ₹ 8,333 and Alternative II has a benefit of ₹ 11,667 over present level. Alternative II has a benefit of ₹ 3,334 more than Alternative I. Hence Alternative II is more viable.

(**Note:** In absence of Cost of Sales, sales has been taken for purpose of calculating investment in receivables. 1 year = 360 days.)

12. Statement showing the Evaluation of Proposal

Particulars	₹
A. Expected Profit:	
Net Sales	1,00,000
Less: Production and Selling Expenses @ 80%	(80,000)
Profit before providing for Bad Debts	20,000
Less: Bad Debts @10%	(10,000)
Profit before Tax	10,000
Less: Tax @ 50%	(5,000)
Profit after Tax	5,000
B. Opportunity Cost of Investment in Receivables	(2,500)
C. Net Benefits (A – B)	2,500

Advise: The sales manager's proposal should be accepted.

Working Note: Calculation of Opportunity Cost of Funds

$$\frac{\text{Opportunity Cost}}{\text{Collection period}} = \frac{\text{Total Cost of Credit Sales} \times \text{Required Rate of Return}}{12} = \frac{₹ 80,000 \times \frac{1.5}{12} \times \frac{25}{100}}{100} = ₹ 2,500$$

Statement showing the Acceptable Degree of Risk of Non-payment

Particulars	Required Rate of Return		
	30%	40%	60%
Sales	1,00,000	1,00,000	1,00,000
Less: Production and Sales Expenses	80,000	80,000	80,000
Profit before providing for Bad Debts	20,000	20,000	20,000
Less: Bad Debts (assume X)	X	X	X
Profit before tax	20,000 – X	20,000 – X	20,000 – X
Less: Tax @ 50%	(20,000 – X) 0.5	(20,000 – X) 0.5	(20,000 – X) 0.5
Profit after Tax	10,000 – 0.5X	10,000 – 0.5X	10,000 – 0.5X
Required Return (given)	30% of 10,000*	40% of 10,000*	60% of 10,000*
	= ₹ 3,000	= ₹ 4,000	= ₹ 6,000

$$\begin{aligned}
 \text{*Average Debtors} &= \text{Total Cost of Credit Sales} \times \frac{\text{Collection period}}{12} \\
 &= ₹ 80,000 \times \frac{1.5}{12} = ₹ 10,000
 \end{aligned}$$

Computation of the value and percentage of X in each case is as follows:

$$\begin{aligned}
 \text{Case I} \quad 10,000 - 0.5x &= 3,000 \\
 0.5x &= 7,000 \\
 X &= 7,000/0.5 = ₹ 14,000 \\
 \text{Bad Debts as \% of sales} &= ₹ 14,000/₹ 1,00,000 \times 100 = 14\% \\
 \text{Case II} \quad 10,000 - 0.5x &= 4,000 \\
 0.5x &= 6,000 \\
 X &= 6,000/0.5 = ₹ 12,000 \\
 \text{Bad Debts as \% of sales} &= ₹ 12,000/₹ 1,00,000 \times 100 = 12\% \\
 \text{Case III} \quad 10,000 - 0.5x &= 6,000 \\
 0.5x &= 4,000
 \end{aligned}$$

$$X = 4,000/0.5 = ₹ 8,000$$

$$\text{Bad Debts as \% of sales} = ₹ 8,000/₹1,00,000 \times 100 = 8\%$$

Thus, it is found that the Acceptable Degree of risk of non-payment is 14%, 12% and 8% if required rate of return (after tax) is 30%, 40% and 60% respectively.

13. Statement showing the Evaluation of Debtors Policies

Particulars	Proposed Policy ₹
A. Expected Profit:	
(a) Credit Sales	15,00,000
(b) Total Cost	
(i) Variable Costs	14,50,000
(ii) Recurring Costs	5,000
	14,55,000
(c) Bad Debts	15,000
(d) Expected Profit [(a) – (b) – (c)]	30,000
B. Opportunity Cost of Investments in Receivables	68,787
C. Net Benefits (A – B)	(38,787)

Recommendation: The Proposed Policy should not be adopted since the net benefits under this policy are negative

Working Note: Calculation of Opportunity Cost of Average Investments

$$\text{Opportunity Cost} = \text{Total Cost} \times \frac{\text{Collection period}}{365} \times \frac{\text{Rate of Return}}{100}$$

Particulars	15%	34%	30%	20%	Total
A. Total Cost	2,18,250	4,94,700	4,36,500	2,91,000	14,40,450
B. Collection period	30/365	60/365	90/365	100/365	
C. Required Rate of Return	24%	24%	24%	24%	
D. Opportunity Cost (A × B × C)	4,305	19,517	25,831	19,134	68,787

14.

Cost Structure for 52,000 units	
Particulars	Amount (₹)
Raw Material @ ₹ 400P	2,08,00,000
Direct Wages @ ₹ 150	78,00,000
Manufacturing Overheads @ ₹ 200	1,04,00,000
Selling and Distribution OH @ ₹ 100	52,00,000
Total Cost	4,42,00,000
Sales @ ₹ 1,000	5,20,00,000

Particulars	Calculation	Amount (₹)
A. Current Assets:		
Raw Material Stock	$2,08,00,000 \times \frac{4}{52}$	16,00,000
Work in Progress (WIP) Stock**	$2,08,00,000 + \frac{(78,00,000 + 1,04,00,000)}{2} \times \frac{4}{52}$	23,00,000
Finished Goods Stock	$4,42,00,000 \times \frac{4}{52}$	34,00,000
Receivables	$5,20,00,000 \times \frac{8}{52}$	80,00,000
Cash		<u>50,000</u>
	Total Current Assets	1,53,50,000
B. Current Liabilities:		
Creditors	$2,08,00,000 \times \frac{4}{52}$	<u>16,00,000</u>
C. Working Capital Estimates(A-B)		1,37,50,000

** Assuming that labour and overhead are incurred evenly throughout the year.

Answers to the Case Scenarios

i.	(a)	ii.	(a)	iii.	(c)	iv.	(a)	v.	(b)
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1. (i)

	Units	Per unit (₹)	Amount (₹)
Raw Material consumption	3,50,000	200	7,00,00,000
labour cost	3,50,000	150	5,25,00,000
Production Overheads	3,50,000	150	5,25,00,000
Cost of Production	3,50,000	500	17,50,00,000
Less: Stock of FG	50,000	500	2,50,00,000
COGS	3,00,000	500	15,00,00,000
Selling and admin exp	3,00,000	250	7,50,00,000
Cost of Sales	3,00,000	750	22,50,00,000
Sales	3,00,000	1000	30,00,00,000
Profit	3,00,000	250	7,50,00,000

Stock of FG (sq. mtr.) = $30,00,000 \times 2/12 = 50,000$

Units sold = 3,00,000

Raw material consumed (sq. mtr.) = 3,50,000

Raw Material Purchases = Consumption + RM stock (15%)
 = 7,00,00,000 + 1,05,00,000
 = ₹ 8,05,00,000

(ii) Stock of Raw Material (15% of 7,00,00,000) = 1,05,00,000
 Stock of finished goods = 2,50,00,000
 Debtors ($22,50,00,000 \times 3/12$) = 5,62,50,000
 Cash = 25,00,000
Total Current Assets = 9,42,50,000

(iii) Working Capital Statement

	Amount (₹)
Stock of Raw Material (15% of 7,00,00,000)	1,05,00,000
Stock of finished goods	2,50,00,000

Debtors ($22,50,00,000 \times 3/12$)	5,62,50,000
Cash	25,00,000
Total Current Assets	9,42,50,000
Creditors ($8,05,00,000 \times 1/12$)	67,08,333
O/s Exp ($18,00,00,000 \times 1/12$)	1,50,00,000
Total Current Liabilities	2,17,08,333
Net Working Capital	7,25,41,667

(iv) Cost reducing debtors credit period

Debtors credit period	= 2 months
Debtors balance	= 21,37,50,000 (2,85,000 units) x 2/12 = ₹3,56,25,000
Debtors credit period	= 3 months
Debtors balance	= 22,50,00,000 x 3/12 = ₹ 5,62,50,000
Amount released from debtors	= ₹ 2,06,25,000
reduction in profit (15,000 units x ₹ 250)	= ₹ 37,50,000
% p.a. cost ($37,50,000/2,06,25,000$)	= 18.18%

Costs of factoring

Commission (2% of 30 crores)	= 60,00,000
Interest	= ₹ 58,50,000
(30cr x 65% x 12% x 3/12)	
savings	= ₹ 36,00,000
Net cost of factoring	$\frac{82,50,000}{65\% \text{ of } 30\text{cr. i.e. } 19,50,00,000} \times \frac{12}{3} = ₹ 82,50,000$
% p.a. cost	= 16.92%

(v) 5,44,06,250 and 18.33%

Maximum Permissible Bank Finance	= 75% of 7,25,41,667 = ₹ 5,44,06,250
Annualised cost of bank loan	= 16.5/90% = 18.33%

APPENDIX

Future value interest factor of ₹1 per period at i% for n periods, FVIF(i,n).

(The Compound Sum of One Rupee)

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100
2	1.020	1.040	1.061	1.082	1.103	1.124	1.145	1.166	1.188	1.210
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177
16	1.173	1.373	1.605	1.873	2.183	2.540	2.952	3.426	3.970	4.595
17	1.184	1.400	1.653	1.948	2.292	2.693	3.159	3.700	4.328	5.054
18	1.196	1.428	1.702	2.026	2.407	2.854	3.380	3.996	4.717	5.560
19	1.208	1.457	1.754	2.107	2.527	3.026	3.617	4.316	5.142	6.116
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.727
25	1.282	1.641	2.094	2.666	3.386	4.292	5.427	6.848	8.623	10.835
30	1.348	1.811	2.427	3.243	4.322	5.743	7.612	10.063	13.268	17.449
35	1.417	2.000	2.814	3.946	5.516	7.686	10.677	14.785	20.414	28.102
40	1.489	2.208	3.262	4.801	7.040	10.286	14.974	21.725	31.409	45.259
50	1.645	2.692	4.384	7.107	11.467	18.420	29.457	46.902	74.358	117.391

Contd.....

Period	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.110	1.120	1.130	1.140	1.150	1.160	1.170	1.180	1.190	1.200
2	1.232	1.254	1.277	1.300	1.323	1.346	1.369	1.392	1.416	1.440
3	1.368	1.405	1.443	1.482	1.521	1.561	1.602	1.643	1.685	1.728
4	1.518	1.574	1.630	1.689	1.749	1.811	1.874	1.939	2.005	2.074
5	1.685	1.762	1.842	1.925	2.011	2.100	2.192	2.288	2.386	2.488
6	1.870	1.974	2.082	2.195	2.313	2.436	2.565	2.700	2.840	2.986
7	2.076	2.211	2.353	2.502	2.660	2.826	3.001	3.185	3.379	3.583
8	2.305	2.476	2.658	2.853	3.059	3.278	3.511	3.759	4.021	4.300
9	2.558	2.773	3.004	3.252	3.518	3.803	4.108	4.435	4.785	5.160
10	2.839	3.106	3.395	3.707	4.046	4.411	4.807	5.234	5.695	6.192
11	3.152	3.479	3.836	4.226	4.652	5.117	5.624	6.176	6.777	7.430
12	3.498	3.896	4.335	4.818	5.350	5.936	6.580	7.288	8.064	8.916
13	3.883	4.363	4.898	5.492	6.153	6.886	7.699	8.599	9.596	10.699
14	4.310	4.887	5.535	6.261	7.076	7.988	9.007	10.147	11.420	12.839
15	4.785	5.474	6.254	7.138	8.137	9.266	10.539	11.974	13.590	15.407
16	5.311	6.130	7.067	8.137	9.358	10.748	12.330	14.129	16.172	18.488
17	5.895	6.866	7.986	9.276	10.761	12.468	14.426	16.672	19.244	22.186
18	6.544	7.690	9.024	10.575	12.375	14.463	16.879	19.673	22.901	26.623
19	7.263	8.613	10.197	12.056	14.232	16.777	19.748	23.214	27.252	31.948
20	8.062	9.646	11.523	13.743	16.367	19.461	23.106	27.393	32.429	38.338
25	13.585	17.000	21.231	26.462	32.919	40.874	50.658	62.669	77.388	95.396
30	22.892	29.960	39.116	50.950	66.212	85.850	111.065	143.371	184.675	237.376
35	38.575	52.800	72.069	98.100	133.176	180.314	243.503	327.997	440.701	590.668
40	65.001	93.051	132.782	188.884	267.864	378.721	533.869	750.378	1,051.668	1,469.772
50	184.565	289.002	450.736	700.233	1,083.657	1,670.704	2,566.215	3,927.357	5,988.914	9,100.438

Present value interest factor of Re 1 per period at i% for n periods, PVIF(i,n).

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057
35	0.706	0.500	0.355	0.253	0.181	0.130	0.094	0.068	0.049	0.036
40	0.672	0.453	0.307	0.208	0.142	0.097	0.067	0.046	0.032	0.022
50	0.608	0.372	0.228	0.141	0.087	0.054	0.034	0.021	0.013	0.009

Contd....

Period	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065
16	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026
25	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010
30	0.044	0.033	0.026	0.020	0.015	0.012	0.009	0.007	0.005	0.004
35	0.026	0.019	0.014	0.010	0.008	0.006	0.004	0.003	0.002	0.002
40	0.015	0.011	0.008	0.005	0.004	0.003	0.002	0.001	0.001	0.001
50	0.005	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000

**Future value interest factor of an ordinary annuity of Re 1 per period at i% for n periods,
FVIFA(i,n). (The Compound Value of an Annuity of One Rupee)**

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.010	2.020	2.030	2.040	2.050	2.060	2.070	2.080	2.090	2.100
3	3.030	3.060	3.091	3.122	3.153	3.184	3.215	3.246	3.278	3.310
4	4.060	4.122	4.184	4.246	4.310	4.375	4.440	4.506	4.573	4.641
5	5.101	5.204	5.309	5.416	5.526	5.637	5.751	5.867	5.985	6.105
6	6.152	6.308	6.468	6.633	6.802	6.975	7.153	7.336	7.523	7.716
7	7.214	7.434	7.662	7.898	8.142	8.394	8.654	8.923	9.200	9.487
8	8.286	8.583	8.892	9.214	9.549	9.897	10.260	10.637	11.028	11.436
9	9.369	9.755	10.159	10.583	11.027	11.491	11.978	12.488	13.021	13.579
10	10.462	10.950	11.464	12.006	12.578	13.181	13.816	14.487	15.193	15.937
11	11.567	12.169	12.808	13.486	14.207	14.972	15.784	16.645	17.560	18.531
12	12.683	13.412	14.192	15.026	15.917	16.870	17.888	18.977	20.141	21.384
13	13.809	14.680	15.618	16.627	17.713	18.882	20.141	21.495	22.953	24.523
14	14.947	15.974	17.086	18.292	19.599	21.015	22.550	24.215	26.019	27.975
15	16.097	17.293	18.599	20.024	21.579	23.276	25.129	27.152	29.361	31.772
16	17.258	18.639	20.157	21.825	23.657	25.673	27.888	30.324	33.003	35.950
17	18.430	20.012	21.762	23.698	25.840	28.213	30.840	33.750	36.974	40.545
18	19.615	21.412	23.414	25.645	28.132	30.906	33.999	37.450	41.301	45.599
19	20.811	22.841	25.117	27.671	30.539	33.760	37.379	41.446	46.018	51.159
20	22.019	24.297	26.870	29.778	33.066	36.786	40.995	45.762	51.160	57.275
25	28.243	32.030	36.459	41.646	47.727	54.865	63.249	73.106	84.701	98.347
30	34.785	40.568	47.575	56.085	66.439	79.058	94.461	113.28	136.31	164.49
35	41.660	49.994	60.462	73.652	90.320	111.43	138.24	172.32	215.71	271.02
40	48.886	60.402	75.401	95.026	120.80	154.76	199.64	259.06	337.88	442.59
50	64.463	84.579	112.80	152.67	209.35	290.34	406.53	573.77	815.08	1,163.9

Contd....

Period	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.110	2.120	2.130	2.140	2.150	2.160	2.170	2.180	2.190	2.200
3	3.342	3.374	3.407	3.440	3.473	3.506	3.539	3.572	3.606	3.640
4	4.710	4.779	4.850	4.921	4.993	5.066	5.141	5.215	5.291	5.368
5	6.228	6.353	6.480	6.610	6.742	6.877	7.014	7.154	7.297	7.442
6	7.913	8.115	8.323	8.536	8.754	8.977	9.207	9.442	9.683	9.930
7	9.783	10.089	10.405	10.730	11.067	11.414	11.772	12.142	12.523	12.916
8	11.859	12.300	12.757	13.233	13.727	14.240	14.773	15.327	15.902	16.499
9	14.164	14.776	15.416	16.085	16.786	17.519	18.285	19.086	19.923	20.799
10	16.722	17.549	18.420	19.337	20.304	21.321	22.393	23.521	24.709	25.959
11	19.561	20.655	21.814	23.045	24.349	25.733	27.200	28.755	30.404	32.150
12	22.713	24.133	25.650	27.271	29.002	30.850	32.824	34.931	37.180	39.581
13	26.212	28.029	29.985	32.089	34.352	36.786	39.404	42.219	45.244	48.497
14	30.095	32.393	34.883	37.581	40.505	43.672	47.103	50.818	54.841	59.196
15	34.405	37.280	40.417	43.842	47.580	51.660	56.110	60.965	66.261	72.035
16	39.190	42.753	46.672	50.980	55.717	60.925	66.649	72.939	79.850	87.442
17	44.501	48.884	53.739	59.118	65.075	71.673	78.979	87.068	96.022	105.93
18	50.396	55.750	61.725	68.394	75.836	84.141	93.406	103.74	115.27	128.12
19	56.939	63.440	70.749	78.969	88.212	98.603	110.28	123.41	138.17	154.74
20	64.203	72.052	80.947	91.025	102.44	115.38	130.03	146.63	165.42	186.69
25	114.41	133.33	155.62	181.87	212.79	249.21	292.10	342.60	402.04	471.98
30	199.02	241.33	293.20	356.79	434.75	530.31	647.44	790.95	966.71	1,181.9
35	341.59	431.66	546.68	693.57	881.17	1,120.7	1,426.5	1,816.7	2,314.2	2,948.3
40	581.83	767.09	1,013.7	1,342.0	1,779.1	2,360.8	3,134.5	4,163.2	5,529.8	7,343.9
50	1,668.8	2,400.0	3,459.5	4,994.5	7,217.7	10,436	15,090	21,813	31,515	45,497

**Present value interest factor of an (ordinary) annuity of Re 1 per period at i% for n periods,
PVIFA(i,n).**

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.823	9.077
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.427
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.644
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.779
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.915

Contd....

Period	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675
16	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.938	4.730
17	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775
18	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812
19	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.843
20	7.963	7.469	7.025	6.623	6.259	5.929	5.628	5.353	5.101	4.870
25	8.422	7.843	7.330	6.873	6.464	6.097	5.766	5.467	5.195	4.948
30	8.694	8.055	7.496	7.003	6.566	6.177	5.829	5.517	5.235	4.979
35	8.855	8.176	7.586	7.070	6.617	6.215	5.858	5.539	5.251	4.992
40	8.951	8.244	7.634	7.105	6.642	6.233	5.871	5.548	5.258	4.997
50	9.042	8.304	7.675	7.133	6.661	6.246	5.880	5.554	5.262	4.999